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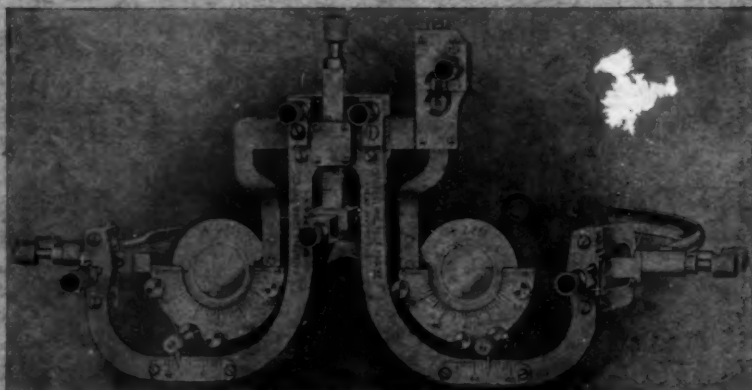
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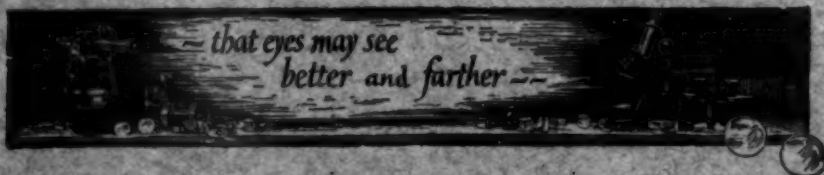
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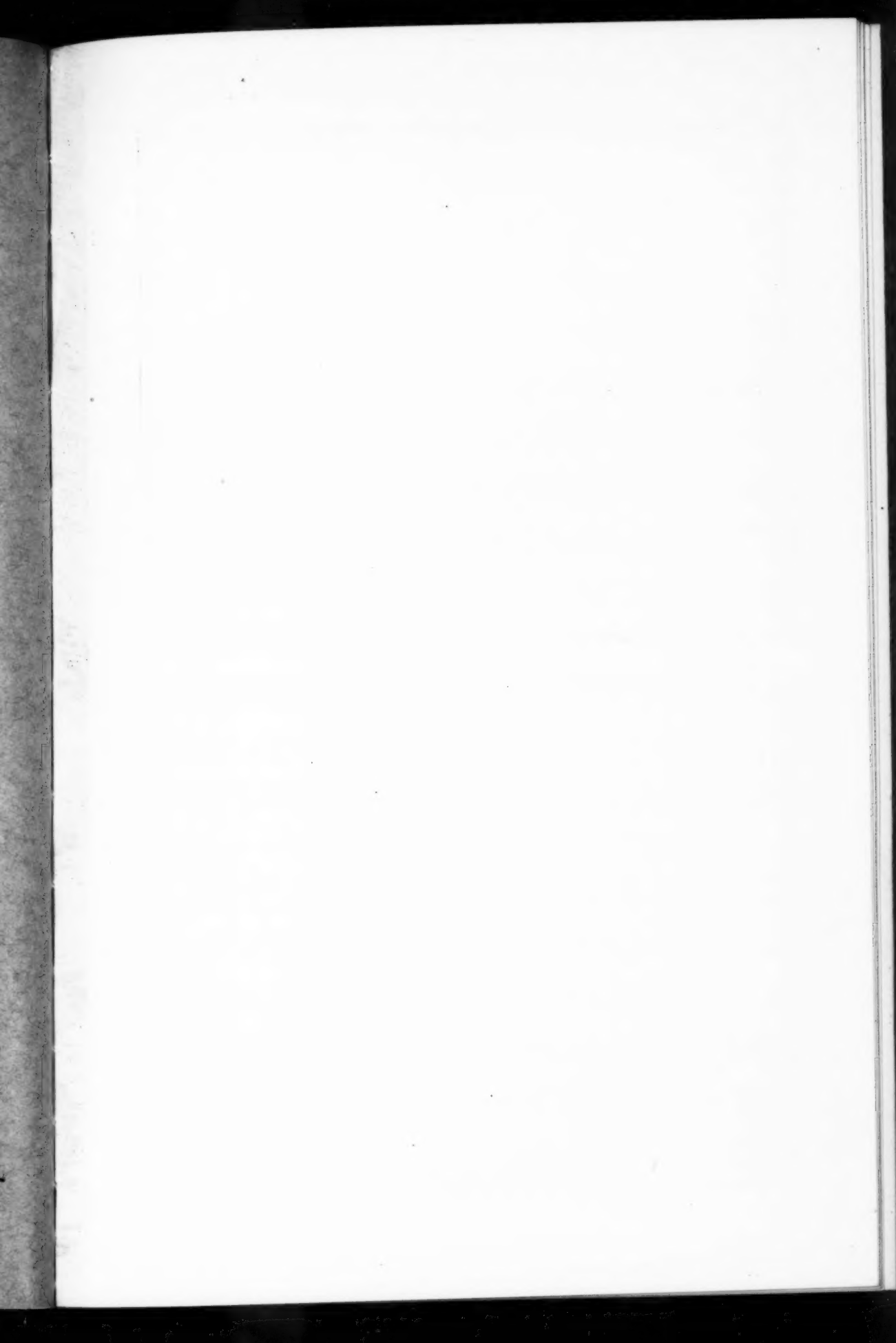
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CASE I



CASE II



THROMBOSIS OF RETINAL VEIN WITH HEMORRHAGE, FOLLOWING INFLUENZA (JACKSON)



# AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. 3

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## THROMBOSIS OF RETINAL VEINS AFTER INFLUENZA.

EDWARD JACKSON, M.D.,

DENVER, COLORADO.

Two cases are here reported with citations from the literature confirming the connection between influenza and thrombosis. Read before the American Ophthalmological Society, June 16, 1920.

The clinical course and exact pathologic changes of obstruction of the retinal vessels are still so imperfectly known, that we are justified in recording additional cases that seem to be of this character.

CASE 1. Mrs. H. J. M., aged 59. History negative, except an attack of influenza, in May, 1918, from which she lost over 20 pounds in weight. Two of her children, both young adults, subsequently died of this disease. Having suffered severe pain in the head and eye the day before, the sight in the right eye became very dim on June 20. She was given potassium iodid in moderate doses which made her very sick at stomach; and she was kept in bed for several days. Later she was given this drug up to 5 grains three times a day; but it could not be continued, and 2 or 3 grains a day was all that was well tolerated.

1918. 7:22. First seen by the writer with vision R. = .006 excentric. L. 0.5, without glasses. She thought the sight of the right had grown a little better in the last day or two. General health good, blood pressure 140-120. Urine normal. External appearance of eyes normal. Media clear. The arteries seem rather pale with broad light streak. The veins are a little irregular in caliber and slightly obscured at some crossings, especially in the macular region of the right eye. In this region there is a large hemorrhage two and a half disc diameters in diameter. This has a nearly circular smooth outline; and the upper more than half has been absorbed. Its original border is shown by a light grayish line apparently not a reflex. A second hemorrhage, much smaller, is situated near

the upper temporal margin of the first. Both are apparently subhyaloid in situation. A still smaller hemorrhage is seen along the lower nasal branch of the retinal artery. The lower macular vein is large, tortuous and obscured as it approaches the macular hemorrhage. Several other small hemorrhages are found in its distribution.

7:26. The above appearances are shown in the sketch made today. (See accompanying color plate, Case 1.) The absorption has progressed since the eye was first examined. There are also white spots in the retina near the lateral borders of the large hemorrhage.

7:31. Vision had increased in R. to 0.8.

8:5. Vision R. = 0.67.

1919. 1:11. Corrected vision is now: R. +1  $\odot$  -0.50 cyl. Ax. 75° = 1.

L. +1.50  $\odot$  -1. cyl. Ax. 95° = 1.2.

The area originally covered by the larger hemorrhage now presents about 50 white dots scattered thruout its extent, each looking much like those shown, outside this area on plate, which have not entirely disappeared. The appearance of these dots resembles Plate XXXIX, Fig. 89, in Frost's Atlas<sup>1</sup>; except that in this case the dots are seen, not against a dark area of hemorrhage, but against almost normal fundus. Except for these, and the slight vascular changes noted at the first examination, the fundus of the right eye appears normal.

CASE 2. Mrs. G. B. G., then aged 33, was seen for headache and eye ache in 1918. 5-9, and given the following:

R. -0.75 cyl. ax. 88° V. = 1.2.

L. -1.37 cyl. ax. 88° V. = 1.2.

The ocular fundus was normal in each eye, except that the retinal veins were slightly obscured at some of the crossings. The glasses relieved the headaches. Her history was otherwise negative.

1918. 12:2. About October 10th she had influenza, was in bed five days, then had general headache four days. After this she noticed blurred vision. She remained weak for about two weeks after the attack. Vision is now R. 1.2, L. 0.3. There seem to be "streaks of cloud" just below the point looked at. There

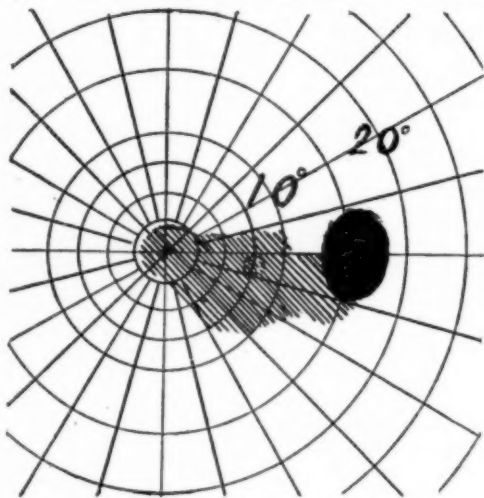


Fig. 3.—Chart of field of vision Case. 2. Relative scotoma shown by lines includes fixation point and extends to normal blind spot.

has been no change in this since the appearance was first noted. She is feeling very well now; blood pressure 155 systolic, 120 diastolic.

EXAMINATION. The eyes externally appear normal. The media are clear. R. Ocular fundus normal. L. An area of moderate haziness, swelling, and striation of the retina extends from above the disc to include the fovea. (Shown in the color plate. Case 2.) This area is rather sharply limited in most directions. In it are seen numerous flame-shaped hemorrhages, some white spots, and tortuous dilated veins. (At this time the upper temporal vessel which was obstructed was so hidden at the disc, that it might be taken for either an artery or vein, but later was found to be a vein.) The fovea shows as a darker

red spot. The scotoma found to correspond to this area is relative. (Fig. 3.) A 6 mm. square of white against a black screen, is seen at one-half meter; except in the blind spot (which is a little enlarged), and at points corresponding to the larger hemorrhages and white spots. No change in the ocular refraction. She was given potassium iodid and told to rest the eyes.

12:19. Vision L. 0.15. There is less haziness of the retina, except around the fovea, which is about as shown in the sketch. No fresh hemorrhages are seen, but some previously seen look larger and their edges appear more distinct. Others are certainly smaller, and some of the small ones have disappeared. The white spots are larger and more definite.

1919. 1:30. The hemorrhages are all much smaller. There is still edema in the macula. The boundary of the affected area is elsewhere indefinite, or wholly gone. L. V. = 0.3.

2:28. Hemorrhages all gone. V. = 0.5.

4:18. L. V. = 0.8.

5:28. The fundus appears normal, except a few fine newformed, tortuous vessels are seen in the patch of hazy exudate, near the upper temporal margin of the disc. V. = 0.8. The slight obscuration and narrowing of some veins at crossings is no longer noticed.

10:8. All newformed vessels are gone. The upper temporal vein appears quite regular and normal. The fundus to the upper temporal side of the disc is possibly a little pale and gray. Elsewhere it is normal. L. V. = 1.

1920. 3:19. L. corrected V. = 1.1 with some hesitation. She cannot see the whole of the letter. The fundus looks entirely normal in both eyes.

COMMENT. It may be questioned if Case 1 is an instance of thrombosis of a retinal vein. The hemorrhages were relatively few, and they were not confined to a single branch. Still they were multiple in the macular region, and one vein going into the lower part of the region was markedly enlarged, tortuous and irregular. On the other hand the hemorrhage in the lower nasal quadrant was close to an artery, and there was no other evidence of disease in that region.

In case 2, the evidence of venous thrombosis is more convincing. A single venous area was affected, the vessels elsewhere remained unaffected, and in this area became normal subsequently. The patient became and continues healthy. There was a distinct area of retinal edema. There was evidently a serious lesion of the venous trunk in question.

In both cases there were slight indications of increased blood pressure in the retinal vessels, but not more than we often find in patients near or after middle life, in good general health, who go for years without retinal hemorrhage or impairment of vision. In case 2 these are no longer noticed. The completeness of the recovery of vision, and also of the general condition of the fundus as discernible with the ophthalmoscope seem to indicate that the cause was neither permanent nor progressive. The blood pressure taken at different times was scarcely abnormal for the patient's age.

In its general tendency to cause thrombosis of large peripheral vessels, influenza is ranked (Blumer<sup>2</sup>) close after typhoid and the puerperal state. I have seen severe orbital thrombosis in a case of fatal influenza, and other cases have been reported. In his classic paper on Thrombosis of the Central Vein of the Retina, Coats<sup>3</sup> says, "The patients are usually apparently in their ordinary health. I have, however, in 3 cases obtained a history of influenza, a disease which is known sometimes to cause thrombosis in the cerebral vessels. In two of them dimness of vision occurred during convalescence, and in one about a month after an attack." It is not clear whether this history of influenza was obtained in 3 of the 4 cases in which Coats made the pathologic examination of the eye; or in a larger number of cases that did not come to such examination. However, Coats<sup>4</sup> reported still another case. "Thrombosis of the left central vein in a man aged 31. Onset probably during an attack of influenza a fortnight before."

Under the heading "Retinal Phlebitis," E. S. Thomson<sup>5</sup> reported 2 cases in many respects similar to those here reported.

A man of about 50 years had influenza and one month later his sight became hazy. Seven months later he had another attack of influenza and a recurrence of the retinal condition. In this attack the lesion occupied an area 6 or 8 times as large as the optic disc. The other patient was a man of 39 whose eye became blurred 2 or 3 weeks after recovery from an attack of influenza. The affected region lay below the optic disc. In both these cases medical examination seemed to exclude an arteriosclerosis.

Leyden and Gutmann,<sup>6</sup> among 186 cases of influenza presenting ocular lesions classified 3.2 per cent as retinal lesions, and 2.7 per cent as glaucoma. Among the latter it is probable that a large proportion were cases in which glaucoma followed thrombosis of the central retinal vein. Of 253 cases of optic neuritis ascribed to infectious disease, Uhthoff<sup>7</sup> found 72 followed influenza. It might be well to consider if cases classed as optic neuritis or retrobulbar neuritis may not often be due to a thrombotic process in the nutrient vessels of the optic nerve.

Stieren<sup>8</sup> among 221 cases of influenza found 54 presented ocular symptoms. Of four fatal cases in pregnant women, one with "marked neuroretinitis," had small flame shaped hemorrhages, another "had a fundus picture closely simulating albuminuric retinitis"; and another "an extremely cyanotic retina."

The white spots in the macular and paramacular region, which were a striking feature in both my cases, and such as are figured in Frost's Atlas,<sup>1</sup> have been seen in other cases of retinal venous thrombosis. In a case reported by Parsons<sup>9</sup> of partial thrombosis of the central vein of the retina, they were a very striking feature. Many of them remained when the case was reported almost 3 months after the attack, altho they were then diminishing.

An interesting point is the preservation of the field of vision in these cases. This contrasts strongly with the condition found in retinal embolism, and with chorioretinitis juxtapapillaris. It is a point of considerable practical importance in the diagnosis. It is quite in harmony with the pathologic findings in the

earlier and less malignant cases of thrombosis of the retinal veins, that the obstruction to the blood current is usually not complete. Coats<sup>3</sup> in his case 1, cut the eye in serial sections transverse to the nerve; and states explicitly, "At no point is the vein completely obliterated, nor is any laminated or organized thrombus to be found within it." In this case the retinal hemorrhages were very abundant.

Both of my patients recovered almost their full vision; and in general the prognosis of such cases seems favorable. Both patients are living and in excellent health, 18 months and two years after the retinal thrombus. This is quite the usual outcome of such cases. It is to be recognized that retinal hemorrhage from venous thrombosis due to influenza has not the sinister significance of retinal hemorrhage from some other causes.

#### LITERATURE.

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2. Blumer. *Osler and McCrae's Modern Medicine*, vol. 2.
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5. Thomson. *Ann. of Ophth.* v. 19, 1910, p. 248.
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7. Uhthoff *Deut. med. Wochenschrift*, 1890.
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### SELF-INFLICTED CONJUNCTIVITIS.

HARRY FRIEDENWALD, M.D., F.A.C.S.,

BALTIMORE, MD.

Two cases here reported illustrate unusual methods of producing conjunctivitis where it would not be looked for in civil life. with an effective means of making a diagnosis and a cure.

The interesting account of cases of self inflicted conjunctivitis observed in the Belgian army by Danis, published in the August number of this JOURNAL leads me to report two cases seen in civil life.

Injuries and inflammations of the eye, self induced, have been described frequently. In degree they have varied from the mildest conjunctivitis to complete destruction of the eye;—the injury has been produced by rubbing the conjunctiva and the cornea with the fingers or with clothes and other objects,—by the introduction of foreign bodies, by injury with sharp instruments, by leech bites, etc. An interesting survey of the subject was given by Herford of Wiesbaden in 1904.<sup>1</sup>

The difficulty in dealing with these cases lies chiefly in the diagnosis. This is well shown in the cases to be described.

J. D. H., aged 15, was brought to me from North Carolina on January 6, 1911. He had begun to complain about the first

of the past November of inflammation of the eye and had been under constant treatment since then. His physician who referred him to me wrote: "I have treated him since early in November and have used at various times cupri sulphat, zinc, silver, argyrol, zinc sulphat, boracic acid and bichlorid salve."

In spite of this, the eyes had gradually gotten worse. On examination, the lids were found markedly congested, as was also the conjunctiva. The conjunctiva was swollen and thickened. There was a free lacrimal discharge. I was soon convinced that the trouble was mechanical and probably caused by irritation by rubbing with the fingers. I therefore applied no treatment but had eyes protected by Buller shields and washed them twice daily with boracic acid. The effect was immediate and pronounced. Complete recovery rapidly took place and there has been no recurrence during four and a half years of observation.

The refraction was tested under a



mydriatic and a high degree of hyperopia was found, but his vision altho examined a number of times was subnormal and could not be brought beyond 16/30. Glasses +3.50 D.s. were prescribed in October, 1911. It was seen, however, that there was a marked loss of accommodation and tho tested a number of different times, he was never able to read without additional spherical correction. Bifocal lenses were therefore prescribed. When last seen, June 4, 1915, his vision was R. E. +3.75=20/19. L. E. +4.0=20/19. With addition of +2.0 he was able to read 0.5 D. at 13 inches. He has been wearing these glasses for some time with perfect comfort and has been able to carry on his work as a college student without difficulty.

In this case there was no evidence of hysteria or of an effort to exaggerate the symptoms. My impression was that the boy had gotten into the habit of rubbing the eyes thru an attack of mild conjunctivitis; and that a vicious circle was established which was only broken when the eyes were hermetically sealed. No explanation could be found for the paresis of accommodation nor is it known when this began. If it was present before the attack of inflammation of the eyes, then it is not improbable that the effort of near vision, in spite of a fair correction for the distance, was a factor in the production of the irritation which led to the rubbing.

Miss M., aged 17, was first seen October 2, 1905, in consultation. There was hypertrophy of the conjunctiva, with granular tissue near the outer and inner side of the lower lid. She was a well-nourished girl of large build, otherwise in good health, but who had a few years previously been severely burnt over a large part of the body.

She brought me a letter from the late Dr. R. L. Randolph, in which he stated: "I have tried everything I know of and with no satisfaction. Some four or five years ago she was under my care for a superficial keratitis of both eyes. She got all right after a few weeks' treatment. Since then she has occasionally seen me for a change of glasses. The corneal trouble has left an enormous

amount of astigmatism which I have approximately corrected. Nearly a year ago she came to me with the condition which you now see in the right lower conjunctival sac.

"I have tried protargol (both ten and forty per cent) but with no success. Argylol was tried for several weeks. Mild solutions of hydrarg. biclor. and hydrarg. cyanid. were also used, and some such weak solution or collyrium she has been using all the time. Weak solutions of adrenalin and boric acid have been employed for periods of varying length; and she is now using a solution containing adrenalin, cocain (two grains) and some boric acid. The lachrimation worries her not a little and there is often considerable burning. I might add too that I have tried blue stone and also alum on the hypertropied folds in the lower sac but with apparently no benefit.

"Three months ago I advised her to see de Schweinitz who suggested roller forceps and having the nasal apparatus looked into. I operated with roller forceps and she has been for some time under a throat man who is cleaning out the right nostril. Thus far nothing has relieved her, and I trust you can suggest something which may help the cause. I have consumed almost a year in doing her no good. . . . I might add that de Schweinitz agrees with me as to the non-trachomatous character of the trouble."

My own view was that there were a number of granulations in the upper lid which were unmistakably trachomatous. Dr. Randolph subsequently excised some of the granulation tissue and examined it especially with respect to the possible factor of tuberculosis, but with negative result. She was referred to others for examination, to Dr. Weeks and in March, 1907, again to Dr. de Schweinitz, who advised correction of her high degree of astigmatism, and suggested a thoro analysis from the standpoint of physiologic chemistry and treatment according to strict dietetic lines. The patient was then placed under the observation of Dr. de Schweinitz for a short period and he "ordered a glass of moderate tint which was an approximate correction of her very high astigmatism, Right eye -4. cyl. axis 10°; L. +1.50s



—2 cyl. axis 15°. It is worthy of note that in his opinion there was "a very large neurotic element in cases like this."

When I saw Miss M. again September 30, 1907, I found the conjunctiva of the upper lid fairly normal, that of the right lower lid showed some cicatrices but no granulations. The condition of the eyes was as described above, marked congestion, great lachrimation and the complaint of much sensitiveness to light, etc., together with a peculiar greasy discharge, the nature of which I was at first unable to determine but which proved to be yellow vaseline, but which the patient denied having applied to the eye.

I was much impressed by the absence of any extension of the disease and by the disappearance of granulations, and it struck me that the condition could best be explained as the result of some continuous irritation, and this led me to suspect that the patient was herself inflicting the injury. The eye was therefore sealed under a Buller shield and no treatment but washing with boric acid was used. The secretion and congestion rapidly disappeared, and only once or twice was the vaseline discovered, the patient having had access to it while in the bath room, so that within two weeks the eye had cleared up almost like its

fellow. In discussing the subject with her physician, I then learned that about one year before she had had hysteric retention of urine which could only be relieved by catheterization.

The patient made progress until October 11, 1909, when she complained of pain and some bleeding from the eye. The Buller shield was again used but on November 25 I saw the bleeding coming from a straight red line near the cornea. She had evidently scratched the eye with a needle. It was deemed best after consultation to give up all treatment and this had the most beneficial effect for since that time there has been no recurrence of trouble.

In this case hysteria and the desire for constant handling and treatment undoubtedly caused the long standing trouble which had baffled our ablest oculists.

The cases just described were both binocular, while Danis describes the condition as always monocular. Like some of the cases of Danis our second case presented "papillary hypertrophy suggesting the granulations of trachoma."

Those who are interested in the subject will find a good account in the article by Herford,<sup>1</sup> and in Holden's<sup>2</sup> "Self-mutilation of the Eyes by an Ancient Saint and a Modern Sinner."

#### LITERATURE.

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2. Holden. Charaka Club, Vol. II.

### VALUE OF DENTAL EXAMINATION IN THE TREATMENT OF OCULAR DISORDERS.

W. L. BENEDICT, M.D., F.A.C.S.,

ROCHESTER, MINN.

This paper from the Section on Ophthalmology of the Mayo Clinic discusses the methods of transmission of dental infections to the eye. It also reports clinical cases in some of which the infection was studied experimentally in the Laboratory of Experimental Bacteriology of the Mayo Foundation. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July 24, 1920. See page 899.

The influence of dental sepsis on diseases of the eye has been investigated by many workers since Lang, in 1913, published his observation on the subject,<sup>1</sup> and a large number of case reports have been published which demonstrate the value of examination of the teeth in treating diseases of the eye.

Carefully observed cases of periostitis, orbital abscess, iritis, and uveitis that can be definitely ascribed to dental sepsis have been recognized and described. While the exact process of extension from the teeth to the eyes was in many instances not known, the improvement of the eye conditions that followed correc-

tion of the disease about the teeth was considered sufficient evidence that a close relationship exists. When a rather severe chronic corneal ulcer that had failed to yield to common methods of treatment healed readily after the extraction of a diseased tooth, when chronic or recurrent iridocyclitis became quiet following the removal of infected teeth or the treatment of pyorrhea, other probable causes of the disease having been eliminated, the conclusion was justified that the disease of the eye was due to disease about the teeth, or that toxins absorbed from suppurative foci about the teeth contribute to the chronicity of the ocular affection.

That pyorrhea or partly decayed teeth in the mouths of persons suffering from disorders of the eye do not more frequently appear to have an influence on the course of the disease has been used as an argument against the causal relationship of dental and ocular affections, but if we more fully understood the characteristics of the organisms that produce disease, and the changes in virulence of the organisms and variations in the strength of the resistance which nature puts up as a barrier to the spread of disease, we probably could more easily account for the few metastatic infections, and arrange a more satisfactory system of prophylaxis.

#### METHODS OF TRANSMISSION.

Eyes, previously healthy, may become diseased by the transmission of organisms from diseased teeth in one or more of three ways:

1. Direct extension thru bone. The tooth socket becomes the seat of an infection that destroys the bone of the upper jaw, and thru that directly affecting the orbital walls, finally producing an orbital cellulitis or retrobulbar neuritis. Such extensions of the disease process about the teeth seldom affect the interior of the eye, but are found as abscesses of the lids, particularly the lower, abscesses of the sinuses, emboli, abscesses of the frontal lobe with atrophy of the optic nerves, and periostitis.

2. Direct extension of the process along the periosteum of the malar bone invading the orbit and giving rise to processes similar to those mentioned.

3. Transfer of organisms from the

focus at the tooth to the eye by the blood stream. This is the most frequent means of transfer of infection from the teeth to the eyes, and consequently is the most important.

It is often difficult to demonstrate that infections about teeth are responsible for any individual case of eye disease. Extraction of affected teeth does not always yield beneficial results. But it should be remembered in this connection that possibly all sources of organisms responsible for the eye affection were not eradicated



Fig. 1.—Case 311972. Acute iritis from dental sepsis.

with the extraction of the teeth, that organs other than the eye have been invaded and become secondary foci for the production of the same strain of organism, or that even after extraction a septic pocket may have remained in the diseased jawbone. Recurrent iritis, keratitis, uveitis, and transient disturbances of ocular motility occur from these secondary foci after the removal of infected teeth and are to be combated by the use of autogenous vaccines.

Some forms of eye diseases that formerly were believed to be due to auto-toxemia, injury, blood disease, rheumatism, or were idiopathic, have been demonstrated to be due to the actual presence of bacteria carried to the eye from suppurative foci about the teeth or tonsils. Rosenow has shown that organisms taken from diseased teeth are capable of pro-

ducing disease of the eye when injected directly into the blood stream of animals; and furthermore, that such organisms have a selective affinity for certain structures of the eye and that within limitations this selective affinity is characteristic of the strain and is maintained thru several cultural transplants of the organism. He has demonstrated that organisms grown from the tooth of a person suffering from muscular rheumatism produce iritis in the eyes of animals as

due to periapical infection. The iris and choroid are more often attacked by organisms from apical infection altho optic neuritis, scleritis, keratitis, and conjunctivitis are reported to have been found.

#### ETIOLOGIC INFECTIONS.

CASE 311972. A man, aged 38, came to the Clinic because of attacks of inflammation in the right eye, every spring and fall for the past six years. The eye had been injured ten years previously but the

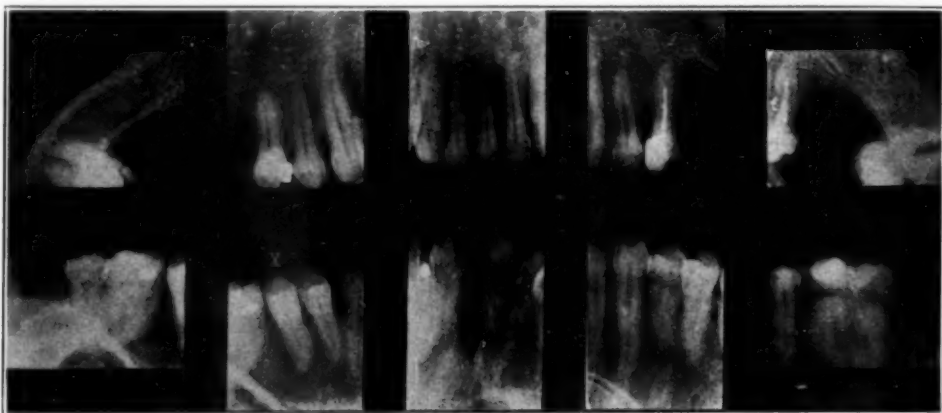


Fig. 2.—Roentgenogram showing condition of teeth in Case 311972. Culture obtained from socket of tooth marked X injected into rabbit produced iritis.

well as hemorrhages in the skeletal muscles.

The barrier that nature erects in defense of the eye may be effective against a specific strain of organism, and since organisms about the teeth multiply in kind as well as in number the fact that an eye becomes diseased in a person whose mouth has been the harbour of pus producing foci for years indicates that his barrier has been broken down, that his resistance has been lowered, or it may mean that a new organism has been introduced against which no barrier has been erected.

Attacks of eye disease produced thru dental sepsis may be of any degree of severity. Mild attacks of conjunctivitis or iritis may occur which amount to no more than a transient hyperemia of the conjunctiva, or a slightly troublesome photophobia. A rapid succession of mild attacks extending over a period of several years has been demonstrated to be

injury seemed to have no bearing on the present condition. The patient had had attacks of rheumatism for the past ten years. The attacks of inflammation of the right eye were always preceded by soreness of a right upper bicuspid which came on about three days before the eye became inflamed, and frequently had been accompanied by general rheumatic pains, particularly if he had been exposed to inclement weather. The adenoids had been removed but the tonsils had not. The patient gave no history of tonsillar infection. A general physical examination did not reveal cause for iritis, except dental infection. The tooth which he pointed out as tender preceding the attack of iritis gave practically no roentgenologic evidence of apical infection. An electric test indicated that the pulp was vital. The tooth was extracted and from the pulp Dr. Meisser secured a culture which, when injected into the blood stream of a rabbit, produced a hemor-

rhagic iritis of both eyes within a few hours (Figs. 1 to 5).

A subculture from this strain of organism injected into the blood stream of a rabbit produced a pericorneal injection within four hours; this entirely disappeared within twelve hours.

Much has been written with regard to the increased surgical risk accompanying abscess of the teeth and pyorrhea which,

dental sepsis has been overestimated, and the risk of metastatic infection following operation is not so grave as to require a person to postpone an operation, say for cataract, until imperfect teeth can be removed and the gums healed. In my own cases I have had no postoperative complications that could be traced directly to dental foci or infection.

It is now well known that inspection of the teeth alone does not reveal disease conditions about the roots. Roentgenologic examination of the entire set of teeth is required and this should be checked by tests of vitality and exploration of the gum line and contact points by means of instruments. Interpretation of findings at examination should be

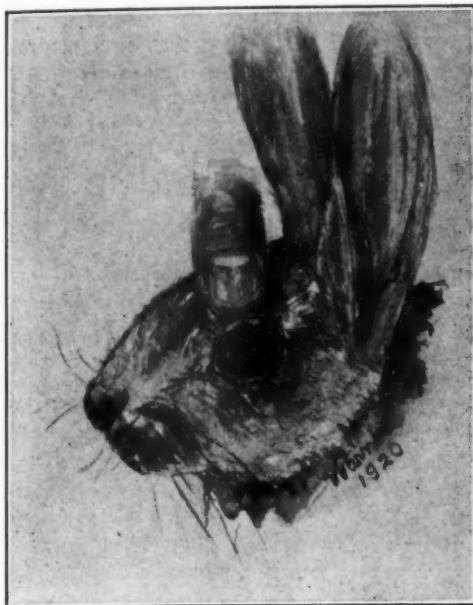


Fig. 3.—Acute iritis in rabbit injected with strain of organisms from infected root canal of Case 311972.

I believe, is without proper foundation. It is not only unnecessary but often inadvisable to subject an elderly person to dental treatment sufficient to make the mouth surgically clean. The extraction of partly decayed teeth, snags, roots, and the vigorous treatment of retracted gums, while desirable from a general hygienic standpoint, is unwarranted as a routine procedure in general ophthalmic surgery, and often imposes hardships on persons whose strength and courage are none too great to carry them thru the anxiety associated with surgical procedures. I do not advise against the cleaning up of month infections before undertaking operations on the eye, but I do believe that the urgency of such procedures has been overstated, the danger of operating in the presence of

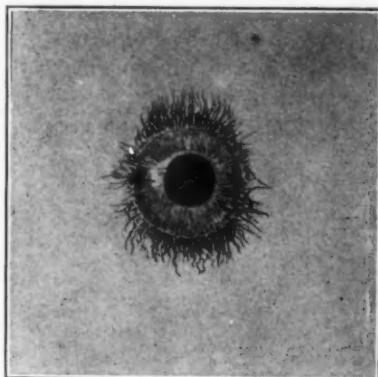


Fig. 4.—Detail of injection of iris and sclera of rabbit's eye, same as shown in Fig. 3.

checked by the history of the patient's dental disturbances. The importance of this point is illustrated by Case 311972. The patient had observed the relationship between periods of tenderness of a certain tooth and recurrence of his iritis, but this particular tooth was vital, as shown by electric test, and the roentgenogram did not give conclusive evidence that there was infection about the root. Another important illustrative case history has been reported by Rosenow.<sup>2</sup> In this patient fractures of the roots of the front central incisors had been sustained eleven years previously, but by inspection alone the teeth seemed to be perfect. Cultures from these teeth injected into the blood stream produced iritis in rabbits.



## REFLEX DISTURBANCES.

The greatest interest centers around the infection of teeth when investigation of the dental condition is carried out in ophthalmic cases, but there remains an equally important field in the consideration of reflex irritation for crowded, unerupted, or impacted teeth. Many instances can be gathered from the literature of reflex spasm of the lids or extraocular muscles, asthenopia, amblyopia, strabismus, and even so-called trophic disturbances believed to be due to irritation



Fig. 5. a and a\*. Hemorrhages at the base of iris, posterior surface. Rabl's eye shown in Figure 3.  
b. Hemorrhagic and edematous area opposite root of the upper left incisor.  
c. Hemorrhagic and edematous area of the muscles of the inner and anterior aspect of the right tibia at the point of insertion.

from the teeth thru the branches of the fifth nerve. The diagnosis of reflex eye disturbances must be made largely thru exclusion. The frequency with which foci of infection are encountered, particularly around the teeth and tonsils, makes it difficult to rule out such foci as responsible for disturbances which may be considered to be of reflex origin. The affections may be only symptoms of neurosis so that at all times a ready acceptance of reflex diagnosis must be guarded against. Ocular disturbances of undoubted reflex origin, however, have been described. The following history is typical of the reflex group:

CASE 247172. A woman, aged 22, complained of periodic twitching and pulling of the right eyelids for the past three and one-half years. She had a great deal of headache of the migrain type. She had worn for several years a correction for myopic astigmatism but use of glasses did not lessen the amount of twitching. There was no photophobia at any time but a dull moderate ache of the right side of the head and face accompanied the twitching contraction of the lids of the right eye which was present at all times, giving the appearance of ptosis. To keep the eye open she augmented the action of the right levator palpebrarum by contraction of the frontalis muscle, wrinkling the right side of the forehead and arching the brow. There was no disease condition of the conjunctiva nor globe and the vision of both eyes was normal. Inasmuch as a general physical examination was reported negative, the patient was carefully refracted and not seen again for a year.

At her next visit to the Clinic she stated that the month following the former visit she had a severe spasm of the right lids accompanied by headache which lasted for one week. For seven months following she had been free from such attacks. The month preceding her second visit, however, she had suffered a similar attack which also lasted for about one week. At the time of her second visit there was no spasm of the orbicularis, and the lids opened and closed easily, altho the lids of the left eye opened more readily than those of the right.

A dental examination was made at this time and three teeth were found to have apical abscesses and four teeth were impacted. A right impacted molar was extracted. Seven weeks later the patient reported that she had not had further attacks of lid spasm and that she "felt as if a weight had been removed from the lids." Nine months later she wrote, "Since I had the impacted wisdom teeth removed my eyelid has pulled but little."

CASE 318611. A man aged 64 came to the Clinic because of diplopia, which had appeared suddenly three months before. The vision was 6/5 in the right eye and 6/7 in the left. The left external rectus was completely paralyzed. A thoro and painstaking examination



was made to determine the cause of the paralysis. Wassermann tests of the blood and of the spinal fluid were negative. A Nonne test was negative, and a neurologic examination failed to reveal any other disturbances of the nervous system. The only other cause found for the paralysis was the possible irritation from infected teeth, and since the patient had a number of fractured and decayed teeth, all in exceedingly bad condition, he was advised to have the remaining teeth and parts of teeth removed. The day following the removal of the last teeth the paralysis began to disappear and entirely disappeared within three weeks.

Since the introduction of a dental section at the Mayo Clinic, the relationship of diseased teeth and lesions of the eye has been carefully studied. Definite relationship has been established in a number of cases of acute inflammatory eye lesions and similar lesions produced in animals by means of methods described by Rosenow. Autogenous vaccines made for the patients have been used to supplement the treatment with highly gratifying results. In many conditions of the eye other than inflammation from infection the dental examinations have given valuable aid and results which are encouraging and warrant further investigation.

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## SOME OPTICAL IMPERFECTIONS OF THE EYE AND SOME OF THEIR USES.

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This contribution to the literature of physiologic optics deals with the effects of light entering the eye thru the sclera. It points out the effect such unfocussed light has on visual acuity and on the perception of colors, particularly green. Read before the Colorado Congress of Ophthalmology and Oto-Laryngology, July 24th, 1920. See page 895.

We have all been impressed with the scientific paradox uttered by the greatest master builder of the foundations of your profession when he declared, in effect, that should an instrument maker send him a camera so optically defective as the human eye, he would reject the apparatus with a stinging rebuke. Helmholtz thus in a sentence established the relation between an imperfect organ and its perfect product. Indeed, I venture to believe that the Mind, which after all is the Thing, finds important, if not its most important, material for culture in the physical and physiologic imperfections of the organ of vision. It is a matter of elementary knowledge that the anatomic camera is distinguished by the enormous field of view it gives us with the extreme limitation of the area of visual distinctness. We see clearly only the point directly looked at; all other

points thruout the breadth and depth of the outer world are perceived but indistinctly. A sharp visual impression of them can only be obtained one at a time thru movements engaging the intrinsic and extrinsic muscles of the eye. The sensory perception of these muscular movements is in itself a fund of mental information of profound importance to our being. But what I want to particularly emphasize is the fact that the vast preponderance of the visual world is, at any moment, represented in consciousness by ill defined and physically inaccurate images. It would be insolent presumption for us to assume their uselessness. Rather they should be regarded as the necessary background of visual perception thru which the distinct foveal image acquires a meaning it could not achieve alone.

Sensations from the periphery of the

retina stand to those derived from the fovea somewhat as the common sensibility, which informs us of the position and "aliveness" of our parts, is related to the touch localizing sensations of the skin.

Sensations from the periphery of the retina, with all their obscurity of quality, form and texture must, from the very preponderance of the nerve mechanisms involved, form an essential fund of visual knowledge. They may represent in this field the vast mine of impressions which we are told makes so important the content of the subconscious mind. What I want to emphasize is that the common defects of the eye, if I rightly understand them, tend to reduce all vision to the state in which it naturally comes to us from the periphery of the retina. In a certain way this point of view should bring to the afflicted some solace if, as suggested, the more psychologically important and educative fund of visual knowledge is preserved to the defective eye. For the view is based on the proposition that optical defects of visual definition, within certain limits, may lead to intellectual exercise which eventuates in useful mental development. This suggestion is made in all deference, with the avowed purpose of seeking good in a bad situation. I venture, however, to suggest that it may be worth while for you to study the abundant material presented in your daily practice with reference to the psychologic and intellectual attendants of the minor visual imperfections. For all I know the problem may have been put forward already, tested, and abandoned as fruitless.

I am quite uninformed as to the range of literature prescribed today for students in ophthalmology; but it requires no special knowledge to justify the statement that any curriculum that leaves out the works of Helmholtz, more especially certain popular lectures of his, is essentially incomplete.

When Dr. Jackson asked me to prepare a short paper to present before your conference I had to confess to complete ignorance of any technical theme likely to be of interest to you. But it so happened

that for some years, earlier in life, I had been much interested in the physiologic and psychologic bearing of entoptic phenomena, and of certain radical physical defects in the structure of the eye considered as a camera obscura. Therefore, encouraged by the common knowledge that our most stimulating suggestions often come from a reconsideration of discarded facts, I make bold to bring to your attention, after a lapse of 36 years, some interesting effects resulting from the translucency of the extra-pupillary coats of the eyeball; since it is permitted to quote freely from investigations previously recorded.\*

Perhaps the simplest method of getting at the results is to describe the simple conditions under which the phenomena first became apparent to me: If any one looks at the page of a book or at a piece of plain white paper which is illuminated only by the light of an ordinary reading lamp placed on one side, an interesting series of color phenomena may be demonstrated without the aid of any objective color. When the light is on the right side and the partly separated fingers of the left hand are placed over the face so that different portions of the paper surface are seen by each eye, any one may observe that the sheet appears to have a greenish tint where seen by the right eye, while the color approaches a more or less decided red or orange in those parts of the surface whose light enters the left eye only. It is easy to place the fingers so that only narrow streaks of the white paper can be seen by the right eye while the light from the rest of the surface all enters the left eye. In this case the visual ground is colored red with green bands distributed thru it.

Persons whose color perceptions are obtuse have at first difficulty in recognizing these phenomena, but to those who are practised in the use of their sensations, the colors described appear, under certain conditions, with such intensity as to be properly called brilliant.

When the lamp is changed from the right to the left side the colors are reversed; the paper in this case appears green to the left eye and pale red to the

\*On the Physiological Effects of Light which enters the eye thru the Sclerotic Coat. *Journ. of Physiology*, 1884, v. 132.

right. The demonstration may be made very effective if a pair of rectangular openings, about  $4 \times 10$  mm. in extent, be cut in a piece of black cardboard and separated by a distance equal to that between the pupils. When a white surface is regarded thru the perforations in the cardboard, four images of the two holes are seen; the inner right and outer left-hand figures are impressions derived from the right eye while the inner left and outer right hand rectangles belong to the left eye. Provided the source of illumination is on the right side the former pair of images is green in color while the latter is pale red. By changing the light to the other side the colors are reversed.

The same facts may readily be demonstrated by holding an ordinary visiting card between the eyes so that but half of the page looked at can be seen by each organ; that part towards the source of light appears green and the other red.

Quite the same contrasting color sensations may be produced by the use of ordinary sunlight whenever it falls directly upon the side of the head; a white surface appears greenish to the illuminated eye and pale red to the other.

These color sensations depend upon the passage of light thru the sclerotic and choroid coats of the eye upon which it is incident. The colors are weakened by light entering the pupil directly from the illuminating source while they are greatly strengthened when it is concentrated by means of a lens upon the sclerotic coat of one eye.

It was not until these facts became clear that I found an allusion to, and a short discussion of the subject by Helmholtz. Smith of Fochabers, in the 18th century, seems to have been the first to have mentioned the phenomena. But it was left for Brücke, about 1840, to investigate the subject thoroly. In his remarkable article upon simultaneous color contrasts this author proposed an explanation which readily accounts for all the facts that have been observed.

Brücke first proved definitely that the color sensations under discussion are due to light transmitted thru the sclerotic and choroid coats of the eye and not to that which enters the pupil. The light

which has passed thru the semiopaque walls of the eyeball can no longer form definite images but is tolerably equally diffused over the retinal surface. Moreover, having penetrated membranes richly supplied with blood, the light is no longer white but red or rosy in tint. This red light stimulates and fatigues the "red elements" (or "red substance") of the retina, so that when the image of a white object is thrown, by light entering the pupil, upon the background of the eye, it excites with preponderance the resting "green elements" of the retina and appears green, according to the familiar law of simultaneous contrast. To the eye which is not illuminated by oblique light the white surface takes on a tint complementary to the green as a result of subjective contrast.

So far as I can find, this subject seems not to have attracted the slightest investigation since the early work of Brücke, a fact sufficiently remarkable when the universality and striking character of the phenomena are considered.

When an observer beholds the color contrasts clearly brought out by the light which is transmitted thru the sclerotic coat of the eye from a single candle, the conviction is immediate that the eyeballs are translucent in some degree to even the feeblest light falling upon them. Such being the case, it is interesting to inquire what may be the physiologic effects of light entering the eyes by ways other than the pupillary openings.

In the eye upon which the incident light falls obliquely the green retinal elements are aroused or made more sensitive to objective irritation, while the red elements have their excitability depressed. We should therefore expect that objective greens and colors near the spectral green should appear brighter and more saturated when looked at with that eye, while the red and orange tints should lose in brightness and purity.

In the eye not illuminated by side light, in which by subjective contrast the red elements are rendered most irritable, we should expect to find objective colors to be freshened or depressed in an inverse manner.

A single experiment, not necessary to

describe in detail, substantiated these expectations.

On a clear night the stars and planets may be made to take on a faint color when an artificial light is held by the side of the head.

When I look at a star while holding a light in the right hand and pass an opaque card alternately before the two eyes, the star appears greenish to the right but yellowish or orange to the left eye.

Every one who has experimented with colors has remarked the rapid and progressive diminution of their brilliancy when regarded continuously for even a few seconds at a time. The delight bestowed by a simple spectral color is the most evanescent of pleasures. The sense begins to weary from the moment of its excitement and gradually induces positive discontent and depression. In view of this fact it is remarkable that the green foliage of nature never loses its power of refreshing the observer, but awakens rather increased satisfaction the longer it is gazed upon.

It seems not an undue straining of the facts that have already been mentioned to presume that the exhilarating effect of objective green is partly if not solely due to the light which is colored red by penetrating the side walls of the eyes, and which, by gently stimulating the red elements of the retina, keeps up a constant background of contrast for the green light which enters the pupils, thus insuring its continual freshness. In this sense the indirect light may be said to keep the retina in tone for those colors with which nature commonly presents us.

On a bright day in May I stood looking out of a window upon a grass-covered field. The herbage was brilliantly green in hue with a decided tinge of yellow, and aroused in the beholder an indescribable sense of wellbeing. A common pasteboard mask or "false face," such as children use in play, but blackened inside and with the eyeholes reduced nearly to the size of the pupils, was now placed over the face so that scarcely any light could enter the eye except thru the pupils. The landscape appeared very different under these conditions. The green light of the grass lost its brilliancy

and gradually faded; the yellow sensation became stronger, and the general impression produced was that of a field parched by intense heat. A group of deeply green cedar trees seemed to have a rusty hue and the agreeable condition gave way to a sense of depression.

It would probably be profitable to notice whether some cases of color blindness are not due in part to unusual transparency of the sclerotic and choroid coats of the eye. If such be the case we should expect to find colorblind railway employes very differently sensitive by day and by night, to the two classes of signals used.

On first consideration it would appear that light which enters the eye thru its semiopaque coats should occasion a great optical defect in blurring images formed upon the retina and thus diminishing the distinctness of vision. But it must be remembered, as pointed out by Brücke, that light which has thus indirectly entered the eye can no longer itself form images, but is probably evenly diffused over the retina, in which case there is no reason to believe that it has any influence in diminishing the sharpness of the impression derived from a retinal image. On the contrary, from the following considerations, I was led to suspect that the sclerotic light not only does not diminish but decidedly increases the acuteness of vision; and this hypothesis has been supported by the results of all the experimental tests to which it has been submitted.

In his work upon the structure of ciliated epithelium cells Engelmann declares that by the aid of green light, produced by introducing a piece of green glass between the object viewed and the mirror of the microscope, he was enabled to make out details of structure which were imperceptible by ordinary light.

Lamansky reached the conclusion that the sensitiveness of the eye for spectral green, yellow and blue is greater and for violet, orange and red less than for white light.

These facts would seem to indicate that it is the substance of the retina sensitive to green light that is specially differentiated to give visual impressions their distinctness. It follows naturally



that any influence which exalts the irritability of the green visual substance should raise the acuteness of vision above the normal; and we have already seen that light penetrating the side walls of the eye may be regarded as having this effect of stimulating the green retinal element to an excessive and continuous irritability. Whatever the value of these theoretic considerations, experiment shows that acuteness of vision is decidedly greater when light is allowed to impinge upon the side of the eyes than when it is permitted to enter the pupils only.

It would be tedious for me to detail the numerous experiments designed to elucidate the effect of sclerotic illumination on visual acuity.

Suffice the conclusions reached that *"smaller angles can be perceived and parallel lines distinguished when nearer together if light fall upon the eyes from the side than when such side light is excluded."*

Professor Harrington, formerly director of the Astronomical Observatory at Ann Arbor, has called my attention to the interesting fact that the surface of the moon is seen much more distinctly and in detail when an artificial light, as of a lamp or a candle, is held by the side of the head. On trying the experiment when looking at the moon with the naked eye the result is surprising, and no better demonstration of the beneficial effect of lateral light upon the acuteness of vision could be offered.

While I cannot venture to assert that these observations demonstrate that the eye is a better instrument for its optical defects, it remains a most wholesome thought that the human mind has been able to render from the impurities of the raw material provided by its peripheral machine products which go far to enhance the pleasure and usefulness of vision.

## REPORT OF TWO CASES OF GLIOMA OF THE RETINA.

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This paper describes the later stages of glioma of the retina; conditions rare, but occasionally encountered by the experienced readers of this journal.

The appearance of advanced cases of glioma retinae is so unknown in America that the report of the following cases that came to us at the Kung Yee Hospital in Canton may be of value. The first, a boy four years of age, was brought from a distant home. The family history disclosed only that a grandmother had died of the plague, one brother of malaria, and a second brother from an unknown cause. The parents stated that since the age of one year the child had been subject to some form of fever each year for a period of about three months. After the last attack, ten months previous to his admission to the hospital, the parents noticed an abnormal appearance of the left eye. The protusion of the eye developed rapidly.

On admission, the patient's appear-

ance, except for pallor, was that of a fairly well nourished child. The effect of the disease was chiefly shown in nervousness and sleeplessness. Examination showed that the tumor of the left eye protruded anteriorly 50 mm. beyond the orbit and extended from the roof of the orbit above to the ala nasi below, and from the midline of the nose internally to a point 6 mm. beyond the lateral wall of the orbit. The outer canthus was intact. The inner canthus had separated, yielding to the force of the growth. The eyelids had stretched forward over the tumor a distance of 25 mm. Outside the lids the tumor had a red, beefy appearance. The eyeball was not distinguishable in the tumor mass. The distal portion of the tumor showed an ulcerous depression from which pus and blood exuded



giving an offensive odor. Felt thru the lids the tumor was found to be firm and nodular. A preauricular lymph gland on the left side was broken down and had a discharging sinus. There was enlargement of the superficial cervical and submaxillary lymph glands on the affected side. The right eye was found to be normal.

The second, a baby two years of age, was brought to the hospital on his moth-

tinguishable in the bleeding mass. The child was anemic and emaciated. There was no involvement of the preauricular or cervical glands.

The treatment in each case was an exenteration of the orbit as a palliative measure. The hemorrhage following the operations was slight. In the second case, what appeared to be liquified fat was found in the orbit around the tumor. After the operation, radium was used.

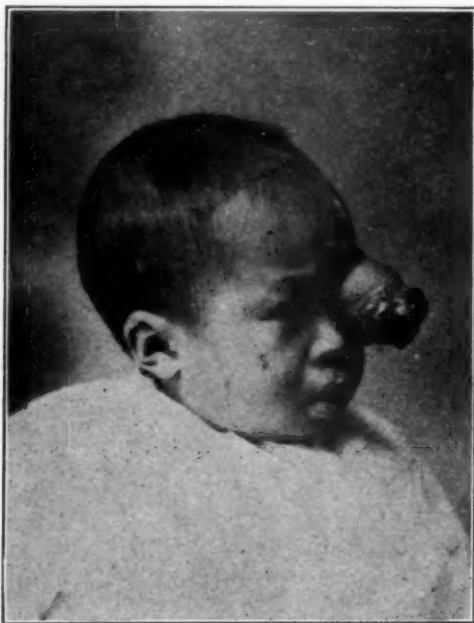


Fig. 1. Glioma of retina in boy four years old. Lesions of eye first noticed ten months previously.

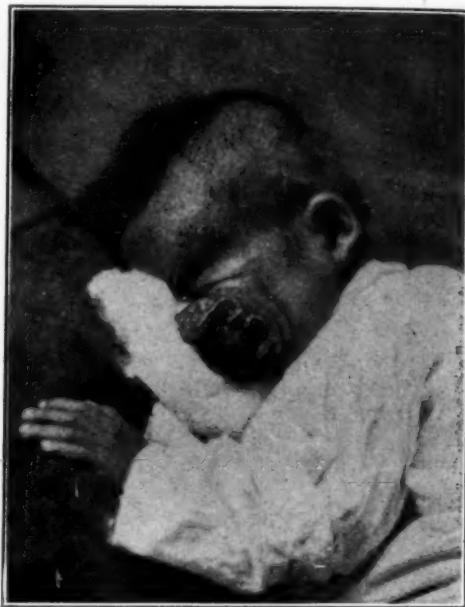


Fig. 2. Glioma of retina in child two years old, first noticed six months before. The swelling of the eye began two months later.

er's back. The history as gotten thru an interpreter showed that the parents had noticed the affection for only six months. The symptoms first noted, as given by the parents were redness, lacrimation, photophobia and pain. After two months the swelling appeared with increase of pain, sleeplessness, pallor and loss of weight.

Examination showed a tumor extending 65 mm. beyond the orbit and with a vertical thickness of 60 mm. and a horizontal thickness of 52 mm. The tumor was red in color, except that the distal portion was a mottled white and green, due to disorganization. Over the latter area was a purulent, malodorous discharge. The eyeball was not dis-

The latter treatment was rather unscientifically applied, as the amount of the radium was unknown, being a recent legacy to the hospital. Healing was comparatively rapid. Case I was still living when the writer left Canton two months after the operation. Case II lived for one month.

The pathologic study of the tumors was made by Dr. James Ewing of Cornell University. The minute structure as shown in the accompanying microphotograph is typical of advanced glioma retinae. Having escaped the confinement of the sclera the tumor grows with such rapidity that the characteristic arrangement of the cells largely disappears.

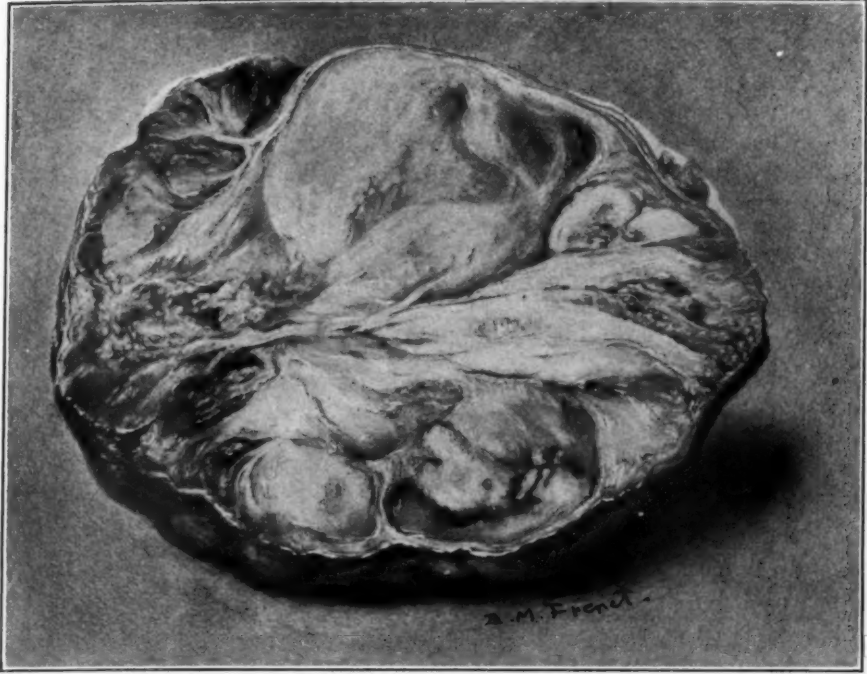


Fig. 3. Tumor mass from Case 1. (Rush.) The struction of the eyeball has entirely disappeared.

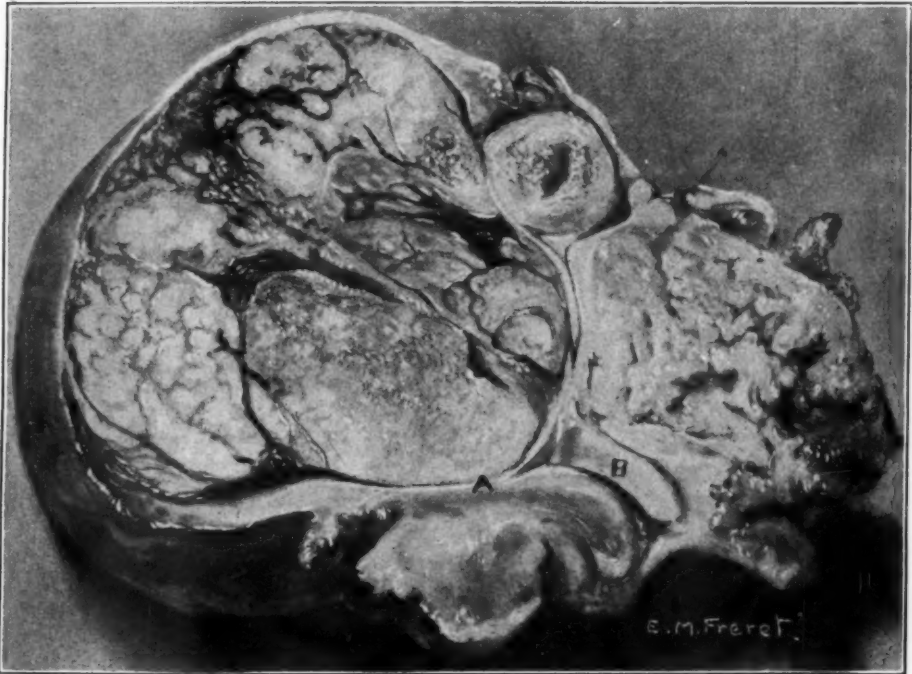


Fig. 4. Tumor mass from Case 2. (Rush.) Showing remnants of sclera A; and optic nerve B.

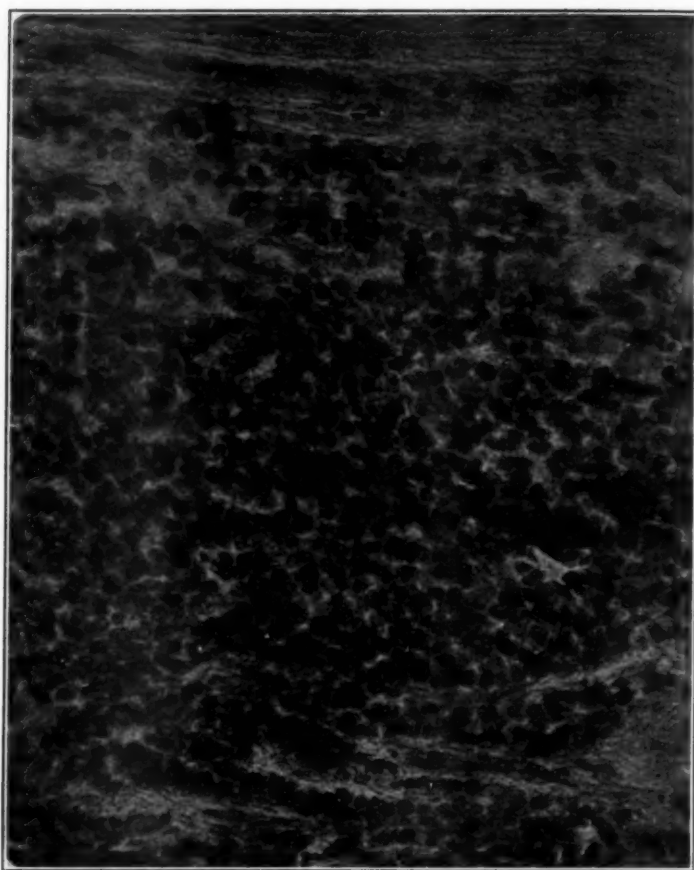


Fig. 5. Microphotograph from section of Case 2, (Rush), typical of advanced glioma, the tumor growing so rapidly that the characteristic arrangement of cells largely disappears.

## MALIGNANT MELANOMA OF THE CHOROID WITH GRADUALLY DECREASING INTRAOCULAR TENSION.

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The case of intraocular tumor here reported is of especial interest because its course was followed five years before its removal, and it illustrates the unreliability of intraocular tension, in differentiating intraocular tumor from simple detachment of the retina. Read before the American Ophthalmological Society, June, 1920.

This patient was first seen in May, 1914, at which time he presented himself for refraction and advice as to an increasing haziness of vision, which had gradually manifested itself during the winter. The examination showed a well nourished man of 64, in apparent good health, actively engaged as the executive head of a manufacturing concern.

Muscles: exo.  $2\frac{1}{2}$  distance. 5 near.

R. V. = 6/22. +1.50 sp.  $\subset$  +0.50 cy.  
ax. 180° V. 6/5.

L. V = 6/22. +2.00 sp.  $\subset$  +1.00 cy.  
ax. 175° V. 6/9.

Add R. and L. +2.50 sp. v. Jaeger 1.  
Intraocular tension, tested with fingers, normal. Field limits, normal. Visual media clear save for a few, fine granular floating bodies in the vitreous.

*Fundus examination.* Both discs of

normal pink-white color, with blurred but traceable margins. Normal physiologic cups. The vessels of the ophthalmic tree are invested with delicate sheaths as they emerge from the disc. Retinal circulation balanced. Retinal arteries brightened, reflexes regular caliber, moderate tortuosity of the smaller branches with some flattening of the veins when crossed by the arteries. Veins normal. Scattered diffusely thruout both circummacular regions are many small, punctate, yellowish, white spots, slightly elevated, crossed by the retinal vessels, with no tendency to coalescence, nor definite grouping as to circulation or each other.

The case was referred to his family physician, a very competent internist with a request for a search for the possible cause of the fundus changes. Blood pressure was reported as 148: twenty-four hour sample of urine, negative: Wassermann tests from two separate laboratories, negative. Radiographs of the alveolar processes showed three lower molars and the upper molars and one root diseased. Otolaryngologic report was negative, except a deviated septum on the left side which interfered with aeration, with possible block to sinus drainage. Sinus radiographs show no shadows. Von Pirquet test, negative.

The suspicious teeth were removed and a submucous resection was subsequently done. Small doses of iodides were ordered.

This fundus picture and vision remained unchanged, the patient being seen twice a year for three and one-half years.

Mid December, 1917, the left vision became blurred. In the left macular region was seen a circumscribed, slightly elevated circular spot, measuring in diameter the width of two or three of the large retinal veins, with definite margins and of a yellowish, white color, similar to the other choroidal lesions with a corresponding defect in the visual field.

Intraocular tension: Right 21. Left 20. Schiötz.

The patient had meantime changed his medical adviser, now being under Dr. DeLancey Rochester. Dr. Rochester was asked to check over the previous examinations, which was done without uncovering any definite etiologic factor.

The spinal fluid examination was reported negative.

The case was under observation until May, 1918, with no observable change in the left eye ground. During my absence in service no observations were made.

He was again seen by me in June, 1919. The right eye was unchanged regarding vision and eye grounds. The left eye showed a smooth, retinal detachment below the macular level and extending toward nasal and temporal sides, with an elevation of about two millimeters. Movement doubtful. Transillumination showed a very faint indefinite shadow above and on the temporal side. Tension: right eye 22, left 17; Schiötz. There was no congestion of the anterior ciliary veins. During the months following there was a gradual extension of the retinal detachment, with no change in the outward appearance of the eye but a gradual diminution of the intraocular tension, which measured 11 millimeters; Schiötz.

Before advising enucleation, the case was referred to Dr. John E. Weeks of New York, for an opinion. Dr. Weeks confirmed the findings as described. He thought that the transillumination shadow, altho indistinct and indefinite, indicated something other than fluid, altho he was unable to determine whether the mass was an exudate or neoplasm. Because of the certainty that the eye would never again be useful as a visual organ, he advised removal.

The patient, unwilling to sacrifice a normal appearing eye, sought further counsel and was sent, on his own request to the late Dr. Samuel D. Risley of Philadelphia. Dr. Risley wrote me he was unable to confirm the shadow upon transillumination and expressed himself as of the opinion that the ophthalmic appearance was not that of a new growth. A von Pirquet test applied and observed by him being faintly negative, and in view of the choroidal changes in the right eye, he strongly advised against enucleation without first trying a series of tuberculin injections for diagnostic and therapeutic purposes. His instructions were carried out by Dr. Rochester with negative results. The intraocular tension had now fallen to 5.

On March 17, 1920, the eye was



enucleated. The following report on the specimen was submitted from the New York State Institute for the Study of Malignant Diseases:

The gross appearance of a cross section of the eye shows a tumor lying in the lower temporal quadrant of the eye, evidently springing from the choroid near the margin of the optic disc. This tumor measured 15x10 mm. and was a slightly nodular irregular ovoid tumor. The surface appeared smooth, was dark gray in color and was of a soft consistency. The retina was markedly detached and contained a clear serous fluid. Cross section of the tumor mass showed a deeply pigmented homogeneous surface.

Microscopically, the tumor varied as to the cellular constituents. There were areas showing many pigment cells and other areas almost free from the same. The tumor was very vascular showing many fine capillaries around which in many places elongated cells arranged themselves. Other areas showed cords of epithelial like cells. While in some places there was distinct stroma, other areas seemed almost free of connective tissue.

Three types of tumor cells could be differentiated. The most common was a large spindle shape cell, having a large vesicular nucleus with a single nucleus.

Other cells were round with hyperchromatic nuclei; while scattered thruout the tumor were large deeply staining cells with one or two nuclei but free from pigment. There were apparently two types of pigmented cells, the one a large irregular cell with long protoplasmic processes densely filled with fine yellowish granules, evidently chromatophores. The other type of pigmented cell was evidently a tumor cell of the type mentioned above but containing fewer granules than the chromatophores. Thruout the tumor were small areas of hemorrhage and between the cells could be demonstrated here and there, free pigment granules.

From this picture, we would make a diagnosis of malignant melanoma, frequently called melanosarcoma, but by some authorities considered as melanotic carcinoma.

This case is reported because of co-existing and independent choroidal changes; the gradually decreasing intra-ocular tension; the persistent absence of frequent collateral symptoms of intra-ocular tumor, hypertension and engorgement of the anterior ciliary veins; and the consequent confusion in making a differential diagnosis between exudate, tuberculoma and neoplasm.

## HEREDITARY REVERSION PIGMENTATION OF THE EYELIDS WITH HETEROCHROMIA OF THE IRIS.

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This is the report of a case of anomalous pigmentation of the skin and iris. The illustration is not a photograph of the patient but is drawn upon a photograph of another person to show the location.

In January, 1911, a girl of sixteen years, came to me for examination into the causes of eye strain. No particular cause was found and this disappeared after following hygienic advice.

The father is a well known business man and has always been accepted as a pureblood white, tho, to the ethnologist, traces of Ethiopian ancestry are apparent in his somewhat kinky hair and rugged cast of countenance. Yet, this particular family claims to be pure American with

an ancestry of English and Irish blood. Indeed, they have traced their family trees back for generations.

The girl was a typical brunette with brown eyes of even color, but my notes of that time, show pigmentation of the somewhat bluish sclera of the left. It was a shock to me to note, in the child of a friend, the evidences of a throw-back, as her features were distinctly negroid, her hair kinky and there was no meniscus of the finger nails; the latter



well known to the Southerners of the old slavery days and a sure sign of negro blood. The father has this, too.

In June, 1920, comes the case again, now a married woman with two children, on account of eye strain and questions me as to the cause of the pigmentation of the eyelids, and as to why her eyes are of different color. Glasses were prescribed for low grade astigmatism.

Interest centers in the general change of her countenance and the development

to those sometimes seen in old negroes and more particularly in half castes with speckled skins. The fundi of both eyes is nonpigmented, but of the brunette type. A peculiar bluish black discoloration of the eyelids on the left side, which extends above the temple on to the forehead, looks just like a "black eye," but there is no history of injury and the coloration is on the Malpighian layer of the skin, showing thru the translucent outer layers. Questioning of the patient



Fig. 1. Diagram showing distribution of pigmentation of lids in Würdemann's case of hereditary reversion.

of onesided pigmentation limited to the left eye and surroundings. Her hair is no longer kinky, but is wavy—perhaps the result of much endeavor by the hairdresser. A sample obtained, shows that it is oval on section. Her countenance is of the European type, but examination of her fingers shows no meniscus of the nails. Her two children have the meniscus present.

The right iris is light brown in color and has distinct markings, while that of the left eye, is a very dark seal brown with no distinct markings. The right sclera is white and the conjunctiva is normal, while the sclera of the left eye is bluish, blotched with pigment and the conjunctiva has pigment patches similar

elicits evident authentic information that there are no other discolored areas on her body, a part of which was submitted for examination. Altho she has had two children, the mammillary ring around the nipple is not at all pigmented.

For obvious reasons, this young woman's photograph was not obtained; in fact, a photograph or even a wash drawing would not show the appearances, satisfactorily. (The diagrammatic representation herewith illustrated shows the area that is implicated.)

COMMENTS. This case is not lentigo or freckles; it is not chloasma or liver spots, for the shade of color is different and is localized. There is no other dis-

ease and no history; in fact, the family history has been investigated and negro blood is denied. Yet the ethnologic aspect is such, that the diagnosis of a color reversion from an infinitesimal amount of negrism, is apparent to the educated eye.

This case is an evidence of the Haeckel and Neo-Lamarckian law, a manifestation of the inheritance of characteristics from forebears, causing variation of type, rather than an acquired anomaly.

Heterochromia iridis is not so uncommon, altho it constituted only about 0.2% of cases at the Zurich Clinic (Lutz).

For discussion of pigmentation of the conjunctiva and of the iris, I refer to article on "Congenital Anomalies of the Eye," by William Frederick Hardy, Volume 4, American Encyclopedia of Ophthalmology, and to his references, all of which deal with these conditions in disease, rather than from an ethnologic aspect.

### ORBITAL, EPIDURAL AND BRAIN ABSCESS. AUTOPSY AND MICROSCOPIC STUDIES.

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NEW HAVEN, CONN.

This is the report of a case which illustrates the danger which may attend acute disease first manifested by ocular symptoms. It was a mixed streptococcus and staphylococcus infection apparently starting with coryza.

The patient, a white male, aged 37 years, was admitted to the New Haven Hospital on June 23, 1920, on my service, complaining of a swollen and painful right eye.

The family history was unimportant.

The past history showed he had never been ill in bed, but had had occasional colds. He had gonorrhea fifteen years before. A few days before the onset of this illness he had a coryza which persisted.

On June 17 the patient first noticed a frontal headache, which was sudden, severe, and soon localized over the right eye. It became rapidly worse and about two and one-half hours later he suddenly became blind in the right eye. After five minutes vision partially returned, everything appearing dark and blurred; this impairment was present at time of admission to hospital. The following morning the right eye was slightly swollen and the pain still more severe. On the 20th he had a chill, followed by fever and sweating. From that time he became rapidly worse, and on the 23rd, entered the hospital. On the 24th he had a chill lasting fifteen minutes. His right upper lid became somewhat swollen and on the morning of June 23rd his whole right eye

was much swollen. The headache remained sharply localized. He had some nausea but no vomiting.

The physical examination showed the patient apparently in some pain. The left eye was normal. The right upper lid was swollen, red, and could not be opened. There was marked edema extending below the ramus of the right mandible. Induration and reddening were present on the forehead and temporal region. There was a slight thin discharge from the eye and marked chemosis. The cornea was clear; the pupil was small and reacted slightly to light. The movements were present but limited. The fundus showed a white disc and dilated veins. The pharynx was injected and there was a marked discharge from the nasopharynx. The teeth were carious and pyorrhea was present. The general physical examination was negative except for the urine which showed albumin, granular casts, red and white blood cells. His blood urea was 22 and nitrogen 44. The white blood count on the 23rd was 20,800 and on the 28th was 26,000.

June 24th under local anesthesia, I made an incision about 2 cm. in length over the orbital ridge at the outer edge of the eyebrows. The orbit was opened

by blunt dissection and a large amount of thick, yellow-brown pus was evacuated. The abscess was found to have burrowed upward between the scalp and skull. A drain was inserted. Large amounts of purulent material drained from the wound. The patient continued to run a septic temperature with maximum rises to over 103° F., and a pulse of about 60 per minute. On June 28th the patient became cyanotic and it was thought best to explore the brain, but the patient died before the anesthesia could be started.

Clinical diagnosis of epidural abscess was made.

**AUTOPSY.** There was no discharge from ears, nares, or mouth. The right eyeball showed a marked exophthalmos and there was a marked purple discoloration around the eye and extending into the right temporal region. About 2 cm. above and lateral to the outer canthus was an incision 1.5 cm. in length from which bloody fluid exuded. The conjunctiva showed moderate congestion. Edema was more marked in the lower than the upper lid. On exposure of the subcutaneous tissues around the eye, they were found to be edematous and hemorrhagic; some free pus was found, especially in the right temporal muscle which had become markedly involved by the inflammatory process.

Upon removal of the calvarium, the anterior right portion of the dura was found to be covered by a thin, yellow fibrinopurulent exudate, and about 100 cc. of bloodtinged fluid escaped from the same region. The dura was adherent over a small area about 1 cm. in diameter on the lower frontal portion. On removal it was torn slightly; the exudate here was much thicker.

On opening the dura the meninges over the left side were moderately congested. Over the right median and frontal portions a thin film of yellow pus was seen, and a few cubic centimeters of fluid pus escaped. No pus was seen around the base of the brain. A thick patch of pus about 1 cm. in diameter corresponded to that described above on the dura. The sinuses of the meninges as examined grossly showed no thromboses.

The frontal sinus was exposed on its anterior side. The lining mucosa was deeply congested and much thickened.

No pus was seen outside of the mucosa, but on slight pressure gray pus exuded through a minute opening, probably artificial. On further exposure the mucosal sac was found to be filled with pus. A probe introduced into the sinus passed easily into the right nostril and pharynx. On removal of the mucosa no necrosis of bone or opening thru the wall was found. The posterior wall of the sinus was, however, very thin.

The sphenoidal sinus was clear.

The ethmoidal sinuses which were situated furthest posteriorly showed collapse of their mucosal sacs and were free from pus. A single large median cell was found to be densely filled with gray pus. Several small anterior ones also contained pus, and there was an apparent communication between one of these and the frontal sinus, just posterior to the opening of the sinus into the nostril.

The orbital cavity was exposed on its posterior superior aspect. A moderately congested mucosal sac covered the contents of the orbit. When this was incised there was found no sign of inflammation in the contained tissues, fat, muscle, nerve or eyeball.

The consistency of the frontal lobe on the right side was much softer than that of the brain elsewhere.

Sections of the brain showed that the right frontal lobe was slightly larger than the left. The ventricles were collapsed. In the right lobe was found an abscess 3 cm. in diameter, filled with thick, yellow pus. Its edges were sharp. In its lateral planes it was about 1 cm. from the cortex, but in the lower frontal direction it had reached the surface of the brain by a small sinus about 3 mm. in width. The point of rupture on the surface was the area of yellow pus described above.

**BACTERIOLOGIC REPORT.** Specimens:

- (1) Operative wound.
- (2) Frontal sinus.
- (3) Extradural abscess.
- (4) Brain (longitudinal fissure).

Cultures of operative wound, frontal sinus, extradural abscess, and brain (longitudinal fissure) showed streptococcus nonhemolyticus and staphylococcus aureus.

All cultures showed grampositive cocci in chains which produced neither pigment

nor hemolysis on blood agar plates, and also showed staphylococcus.

A section of the wall of the mucosal sac showed the squamous epithelial lining to be broken in only a few places. The wall contained many dilated sinuses and blood vessels. The interstitial tissue was edematous and infiltrated with cells which were chiefly of the small mononuclear variety, altho plasma cells, large mononuclear and multinuclear, and pus cells were also seen. The lumen of the sac contained a few cells predominatingly polymorphonuclear leucocytes.

The mucosal sac of the ethmoidal sinus was very similar in appearance to the frontal.

The longitudinal sinus was filled with postmortem clot. One side of the attached membranes was covered by a leucocytic exudate; the other showed little change.

A section of the dura was taken from the frontal portion directly over the point of rupture of the abscess. It showed acute necrosis of the dura, infiltration with pus cells, and edema. The inflammatory exudate covering it was also acutely necrosed.

The edge of the abscess showed acute necrosis of the brain substance, and an exudate of cells which were chiefly poly-

morphonuclear leucocytes. These cells had also infiltrated for a considerable distance into the surrounding brain tissue. The blood vessels around the necrotic zone were dilated and around them mononuclear and polymorphonuclear cells had accumulated. A beginning proliferation of fibrous tissues was present, which apparently arose in the fibrous sheath of the blood vessels. The meninges in the vicinity of the abscess also showed congestion and an acute inflammatory exudate.

**ANATOMIC DIAGNOSIS:** Primary purulent frontal and ethmoidal sinusitis; abscess of the frontal lobe of the brain; localized purulent meningitis; epidural, periorbital, and subcutaneous phlegmon; operation, incision and drainage of phlegmon.

**BACTERIOLOGIC DIAGNOSIS:** (1) Staphylococcus aureus. (2) Streptococcus non-hemolyticus.

The history of this case illustrates, only too well, that all suppurative conditions in the orbit should be regarded as of grave significance.

The writer wishes to express his thanks to Dr. M. C. Winternitz, Professor of Pathology at the School of Medicine, Yale University, for permission to report the work done in his Department.

## HINTS IN RELATION TO THE DYNAMICS OF THE EXTRINSIC OCULAR MUSCLES WITH SUGGESTIONS AS TO TREATMENT OF STATES OF MUSCULAR IMBALANCE.

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This paper points out what is to be expected of normal extraocular muscles. The near point of convergence is found much more important than the power of convergence measured by prisms. But the abduction power measured by prisms is reliable. Muscle imbalance beyond the limits that may be accepted for normal is to be treated by correction of errors of refraction, muscle training and advancement, or shortening of the weak muscle; supplemented in extreme cases by tenotomy. Read before the Colorado Congress of Ophthalmology and Otolaryngology, July 23, 1920. For discussion see p. 892.

Do we, as busy ophthalmologists, pay sufficient attention, in our daily practice, to the possible existence of anomalies of the ocular muscles? Are we not rather prone to examine the refraction in states of asthenopia, and to content ourselves with the correction of any ametropia detected, without looking very deeply into the manner of the performance of the highly coordinated muscular functions necessary to efficient and easy use of the

eyes? These considerations have suggested to me the presentation of this practical paper under the above title.

It goes without saying that in any estimation of the actions of the extrinsic ocular muscles in the case of our patients, we must bear in mind what should be expected of such muscles in a state of ocular health. We must, therefore, in our clinical work, take into account the amount of adduction, abduction, sursum-



duction, and deorsumduction, to be found in the absolutely normal ocular apparatus of the healthy individual, and also the requirements of the physiologic coordination of these muscular functions to secure the normal, healthy, use of the eyes.

Given, therefore, a perfectly healthy subject with healthy eyes, what should we expect of him in the matter of the dynamics of his ocular muscles? I was so impressed with the importance of this matter some years ago, and so discouraged in finding that in my office testing with prisms the results obtained were at such variance with those enunciated by writers considered to be authorities in ophthalmologic matters, that I determined to undertake a series of investigations into the true physiologic bearings of the question.

In furtherance of this plan, I secured the best possible normal material in the persons of one hundred healthy young soldiers of the U. S. Army, who had never had symptoms referable to their eyes, and published the results of my experiments in *The Annals of Ophthalmology* in January, 1898, under the title, "A Contribution to the Study of the Dynamics of the Ocular Muscles."

The results of these investigations justified me in making the following conclusions, which differed from the views generally held at that time.

1. That the degree of adduction (prism convergence) given by most writers as proper for 6 metres, varying from 30° or 35° to 45°, or 50°, can not be reached by healthy eyes except after practice in the use of prisms. Hence the standard is too high for attainment in the first office examination, and hence the method of measuring the convergence by adductive prisms is unreliable and misleading.

2. That the prism convergence for near (33 cm.) is also misleading and is not an accurate test of the real power of convergence.

3. That the determination of the punctum proximum of convergence, with the calculation of the maximum of convergence in meter angles after the method of Landolt, is the only true test of the real power of convergence, or the positive convergence.

4. That contrary to the generally received views, abduction (prism divergence), can fall well below 6° in healthy eyes, and that consequently, it is wrong to assume, upon this basis alone, that such cases are pathologic.

5. That there exists in healthy eyes no positive, definite relation between prism convergence and prism divergence for distance, and that it is not correct to claim that such eyes should, without practice with prisms, show at 6 metres a ratio between these functions of 3 to 1 (Risley), or 7 to 1 (Noyes) in favor of convergence, not permitting abduction to fall below 6°.

6. That we may expect sursumduction and deorsumduction for distance to be about the same in degree. In about 70 per cent of healthy eyes each function reaches 2° (prism) in amount.

7. That in healthy eyes orthophoria exists in about 60 per cent of the cases for distance, and in about 82 per cent for near, and that it is wrong to hold that orthophoria for near is abnormal and to be viewed with suspicion.

8. That in about 40 per cent of healthy individuals, who have never had a symptom of eye trouble, there may be some degree of heterophoria for distance, and that, therefore, we should not assume that every patient showing a slight degree of imbalance is, on that account alone, in a serious ocular condition.

I still hold to the above propositions then stated.

These conclusions were substantiated by Hansell and Reber in their work on "The Muscular Anomalies of the Eye," published the year following the appearance of my monograph. My results were likewise confirmed by Lucien Howe of Buffalo, and the late F. B. Tiffany of Kansas City, as can be seen by reference to their published works.

Assuming, therefore, that these views are sound, and have been substantiated by other observers thru following out a similar line of investigation, let us very briefly take up the practical side of the question.

1st: As regards the power of adduction or convergence.

In testing this power in our offices, the use of prisms, bases out, is to be condemned as being utterly misleading. In

my series of one hundred individuals in perfect ocular health the highest prism adduction attained was  $26^{\circ}$  in one case, the average amount being  $14.1^{\circ}$ .

According to the standard then advanced by the authorities, every one of these men should have been considered in the pathologic class, and it is very likely that many of them, had they strayed into an eye clinic, would have been advised to subject themselves to a series of graduated tenotomies on their external recti muscles. The proper method of determining the highly important function of adduction, or convergence, is to determine the *punctum proximum of convergence*. The result expressed in meter angles will be definite and reliable, and will furnish the *maximum of convergence*.

The use of the familiar dot and line on a card, and a rule, or tape measure, furnish all the apparatus necessary. One should gradually approach the card to the patient's eyes, and as soon as one eye begins to oscillate or turn outwards, note the distance from the eyes at which this takes place. This gives the *punctum proximum of convergence*. Divide this distance into 100 if registered in centimetres, or into 40 if measured in inches, and the result will be the maximum of convergence in meter angles.

In my experience a maximum convergence of 13 meter angles is necessary for comfortable and satisfactory use of the eyes in near work. An individual, therefore, should be able to see the dot singly at 3 inches from the eyes, and if he cannot do this, his power of adduction is not up to the proper standard.

2nd: The determination of the *abduction* (prism divergence) for 6 metres, by measuring this function by means of prisms, bases in, is, on the other hand, free of the objections to be made against the use of prisms to measure the adduction (prism convergence). The degree of prism divergence in healthy eyes is quite definitely fixed, and we cannot, as a rule, increase the amount first determined in any given subject by further practice with prisms (Duane).

The standard power of *abduction* in healthy eyes is about  $7^{\circ}$  (prism). In my 100 healthy subjects the average was  $6.88^{\circ}$ .

By dividing the prism abduction by 7, as is well known, we get the abduction in meter angles. This is the *minimum of convergence* of Landolt, and is *negative*. The usual amount in normal eyes is 1 meter angle.

It is important to determine the amount of *abduction* as a guide to treatment in conditions of weakness of *abduction*, for, if the former is much increased, we may assume an overaction of the external recti muscles, in addition to an insufficient action of their antagonists. It should be noted, however, that the power of abduction in any given subject, with seemingly healthy eyes, can be decidedly higher, or lower, than  $7^{\circ}$ . Duane holds that the abduction (prism) amounts quite regularly to from  $6^{\circ}$  to  $10^{\circ}$ , and that variations above or below these limits must be regarded as distinctly pathologic. Noyes states in his "Diseases of the Eye," that abduction for distance should not fall below  $6^{\circ}$ , and that an abduction of less than  $5^{\circ}$  will in most cases be pathologic.

If these limitations, as given by these writers, are correct, 26 of my 100 absolutely healthy cases would fall in the pathologic class, for these 26 persons showed the following:

Prism Abduction of  $3^{\circ}$ .....in 3 cases  
Prism Abduction of  $4^{\circ}$ .....in 14 cases  
Prism Abduction of  $5^{\circ}$ .....in 5 cases  
Prism Abduction of  $11^{\circ}$ .....in 2 cases  
Prism Abduction of  $13^{\circ}$ .....in 1 case  
Prism Abduction of  $16^{\circ}$ .....in 1 case

It would seem, therefore, that the practical point of view for the ophthalmologist should be to this effect, that he should not establish too inflexible a boundary between physiologic and pathologic degrees of abduction, but should consider that, while fixing the average normal abduction (prism) for 20 feet at about  $7^{\circ}$ , our patients, in the absence of symptoms of muscular asthenopia, might show a variation to some extent in either direction without of necessity falling into the pathologic class.

3rd: Sursumduction and deorsumduction normally are about the same, i. e.  $2^{\circ}$  (prism) in amount. Hence, if, in patients showing a lack of vertical balance, we find a decided difference between these functions, when tested with vertical prisms, bases down, or bases up, we may

assume the existence of a pathologic state.

4th: The indications of conditions of heterophoria with suggestions as to treatment of states of muscular imbalance.

Be it noted that in this discussion paretic conditions, and the various types of strabismus have no place. Slight, or moderate, degrees of heterophoria are possible in 40 per cent of healthy subjects.

In our office work we should give our patients the benefit of this fact. The great majority of these cases are innervational in type, due, in many instances, to altered conditions introduced into the relations between accommodation and associated muscular functions by uncorrected errors of refraction. We should, therefore, in the treatment of these cases carefully correct the refraction, as an essential preliminary, and require this correction to be worn constantly. Presbyopic correction should also be attended to.

In many cases, in which the heterophoria is slight, or moderate in degree, this will be all the treatment required, but in instances manifesting a higher degree of imbalance something else in the way of treatment will be necessary.

Let us now discuss very briefly, and in a very practical way, exophoria, with insufficiency of convergence of the visual axes for the near point, esophoria, and hyperphoria. Cyclophoria, so-called, I do not consider of sufficient importance to be injected into this discussion.

(a) Exophoria: Having determined the existence and degree of exophoria by the phorometer, or Maddox rod, what does the presence of this anomaly signify? Doubt is at once thrown upon the function of convergence. We should proceed to determine the punctum proximum of convergence, and estimate the maximum of convergence in meter angles, as before indicated. Bear in mind this fact that one can not accurately measure the degree of this function by means of adductive prisms. We should then determine the abduction, or minimum of convergence, by the use of abductive prisms. The maximum of convergence should be about 13 meter angles,

and the minimum of convergence 1 meter angle.

If the maximum of convergence is appreciably below 13 meter angles, the case is one of insufficiency of convergence, and, if in addition, the minimum of convergence should be much above 1 meter angle, we may suspect an overaction of the external recti muscles as complicating the case.

Insufficiency of convergence is an innervational condition in the immense majority of cases. Tscherning says in his "Physiologic Optics," "It is not in the muscles; it is in the innervation of convergence that we must seek for the cause of the deviation."

The scope of this paper will not permit of a discussion of the symptomatology and other points in the etiology of this most important condition, and I shall, therefore, beg leave to refer to a paper read by me before the American Academy of Ophthalmology and Otolaryngology at the Cleveland meeting last October under the title, "Practical Considerations in Connection with Insufficiency of Convergence of the Visual Axes." (See A. J. O., April, 1920, p. 269.)

Given a case of muscular asthenopia, in which an exophoria of important degree exists with a maximum of convergence falling well below 13 meter angles, what should one do?

The refraction should be first corrected as an essential preliminary step. Next, if the muscular asthenopia continues, we should attempt to secure an improved innervational impulse from the hypothetical convergence center in the brain cortex by exercises with *adductive prisms*, or by other methods calculated to train the adduction. I am opposed to the use of prisms, bases in, to be worn by the patient, and have not prescribed such for many years. This use is unscientific and tends to increase the degree of convergence weakness. If the measures noted are without result in the way of securing relief from the distressing nervous symptoms of this type of asthenopia, then operation is certainly indicated. If the maximum of convergence does not fall below  $6\frac{1}{2}$  meter angles, nonoperative measures may possibly prove successful. If they do not, however, or if the maxi-

mum of convergence is lower than 5 or 6 meter angles, to start with, then operation will be required.

What type of operation should be selected? Not a tenotomy of an external rectus muscle certainly, for it would be most illogical to weaken a muscle none too strong of itself to assist a weakly acting antagonist. The rational, scientific method is to take steps to enable the weakly acting muscle to perform its duty more efficiently—to, in fact, increase its power. I believe firmly in working on the positive side—not on the negative, and the results of twenty-two years of practice along these lines go to prove the truth of this proposition.

The operation of election in such cases is in the nature of an advancement, or shortening, of the internal rectus muscle of one eye, and if sufficient result is not secured by this means, then a similar operation upon the internal rectus of the other eye at a little later period. This is thoroly in accord with the views of Landolt.

The method, which I would advise, and which I have practiced since 1898, is a modification of the tuck method with the buried catgut suture, introduced by the late Dr. Francis Valk of New York City. This operation has been described in my paper before referred to.

If the convergence insufficiency is of a type and degree that operation as advised, even upon both internal recti muscles, has not been sufficient to secure relief, then we may consider the advisability of a tenotomy of one of the antagonists in addition.

It must be noted here that all cases of convergence weakness do not manifest exophoria for distance. Orthophoria is frequently present, and even an apparent esophoria may be in evidence. This latter need not obscure the diagnosis. The insufficiency of convergence as determined by the method advised is positive, and furnishes the key to the situation. This pseudo, or apparent, esophoria may be explained as the result of a constant effort to maintain sufficient convergence to avoid heteronymous diplopia for the near point, a partially spastic condition of the internal recti muscles being induced, which would be responsible for the tendency of the visual axes to cross within infinity.

This condition does not in any way interfere with the treatment of the convergence insufficiency for the near point, whether by prism exercises or by operative measures. It will disappear after the correction of the insufficiency of convergence.

(b) Esophoria: In the majority of cases of esophoria, this anomaly is associated with accommodative strain, as in hypermetropic conditions, tho we may find this form of imbalance in myopia, or even in emmetropia. Some observers consider esophoria due to convergence excess (Hansell and Reber), some as the result of divergence-insufficiency (Landolt), and some as caused either by convergence excess or by divergence insufficiency (Duane).

In moderate degrees of esophoria it is probable that accurate correction of the refractive error, if any be found to exist, will be sufficient to relieve the state of muscular imbalance, and such treatment should invariably be used before making any other attempt. If the tendency to convergence should continue, nevertheless, one must choose between the constant use of prisms, bases out, in combination with the ametropic correction, and surgical interference. No advantage will be gained by exercises with prisms, bases in, to stimulate the power of abduction, and this method is not recommended.

In an esophoria of slight or moderate degree, say, up to 6° (prism) in amount, the ametropic correction may possibly be all that will be required. If, however, such a fortunate result should not follow, prisms, bases out, should be combined with the glass correction. It is best to correct half of the esophoria and divide the correction between the two eyes. It is almost certain that the prisms will have to be increased up to the full amount of the original esophoria, and probably to a greater degree as the condition is liable to increase from their use. If the esophoria should advance beyond 8°, or if it should be 10° to start with, then operation is indicated in the presence of continued asthenopia.

What should our operation be? A tenotomy of the internal rectus muscle of one or both eyes, or should we perform an advancement of one antago-



nist, or both, in extreme cases? In this condition, also, I adhere to the views of Landolt that an operation in the nature of an advancement of one or both antagonists is indicated, and is the operation of election. The tuck operation again applies here as efficiently as it does in convergence insufficiencies, and the technic is the same with the exception that the external rectus muscle is subjected to operation instead of the internal.

(c) Hyperphoria: As indicated in the results of my experiments, we may expect to find a slight degree of hyperphoria, up to about  $2^\circ$ , in 7 per cent of individuals with healthy eyes. Practically, therefore, we should give our office cases, showing such a degree of this type of muscular error, a chance to secure proper vertical balance by the use of lenses to correct any existing ametropia before proceeding to use treatment more definitely directed against the hyperphoria seeming in evidence.

We must remember that a spurious hyperphoria may exist, which may disappear after the correction of an error of refraction, or the relief of an esophoria or exophoria. In conditions of hyperphoria amounting to from  $4^\circ$  to  $6^\circ$  this will rarely be found possible. In such cases, in which the asthenopia persists after the correction of the refraction, and where exophoria, or esophoria, is not present, we may assume that the hyperphoria is permanent, and that we will, at least, be forced to make use of prisms vertically placed for constant use. The prism strength should be one half of the manifest hyperphoria to commence with, the prism correc-

tion being divided between the two eyes, base down before one and base up before the other. The hyperphoria may in all probability show a constant increase under this use of prisms, requiring a commensurate increase in the prism strength employed.

When the manifest hyperphoria reaches  $6^\circ$  (prism) it is time to operate. In the case of the superior and inferior recti muscles in hyperphoria, just as in the internal and external recti in lateral imbalance, the tuck operation is the surgical measure of election. I placed the lowest limit for operation at  $6^\circ$  (prism) of hyperphoria for the reason that the smallest tuck that can be taken in either the superior or inferior rectus muscle will have this much effect. The depth of the smallest tuck that can be taken will be about 2 millimetres, and this will be followed by about  $6^\circ$  (prism) of effect. It must be noted that the effect in either of the vertical muscles is relatively much greater than would result from the taking of a similar fold of tissue in either of the lateral muscles. This fact has been forced upon me in a very practical way at the operating table.

In correcting a given condition of hyperphoria, one can take the tuck in the inferior rectus of the hyperphoric eye, or in the superior rectus of the hypophoric eye.

I shall add, in conclusion, that the effect produced in the tuck operation for any type of heterophoria should be tested at the operation by the use of prisms with the test object, preferably a candle flame, at 20 feet. Since the operation is done under local anesthesia, this is perfectly practicable.

## NOTES, CASES AND INSTRUMENTS

### OPERATION FOR RESTORING CANALICULUS.

FRANK W. DEAN, M.D.  
COUNCIL BLUFFS, IOWA

Following the probing of the nasal duct or treatment of dacryocystitis, the canaliculi are frequently slit in such a manner that the normal action of the

lacrimal apparatus has been destroyed. To restore the canaliculi to their proper function, I do the following operation, under a local anesthetic. Satisfactory anesthesia may be secured by packing the canaliculus with cotton dampened with adrenalin chloride and a 10 per cent solution of cocaine, leaving the cotton in contact with the tissues for about ten minutes.

Using a mouse-toothed forcep and a small, sharp-pointed pair of scissors, I dissect off a strip of mucous membrane from the inner side of each lip of the opened canaliculus, leaving about 1 mm. of mucous membrane on each lip at the end to form the new punctum. Also leave a strip at the bottom of the slit to form the lumen of the new canaliculus. Bring the raw surfaces together with sutures.

I remove the sutures after four days, and wait a week longer to allow the union to become firm, before testing for results by probing.

I report a case in which the canaliculi were especially mutilated, on which this operation was performed:

Mrs. L., 23, came with the request that I probe her right duct to relieve tearing. On examination, I found that both canaliculi had been slit completely from one punctum to the other, leaving a gaping, horse-shoe shaped opening, thru which I could look into the lacrimal sac. The nasal duct was patulous, allowing water to pass down freely; in fact, air was forced into the patient's eye when she blew her nose. The cause of the tearing was evidently the destruction of the suction of the lacrimal sac, due to the wide open canaliculi.

I performed the operation for restoration as just described, freshening the edges of both canaliculi around the bend of the horseshoe, uniting the two lips with three sutures.

The following results were obtained: The new puncta and canaliculi will just pass a No. 5 Bowman probe without force. The puncta lie in proper position. The disagreeableness of forcing air into the eye from the nose is relieved. The normal function of the lacrimal apparatus is restored and the patient is relieved of tearing.

#### PAINLESS SUBCONJUNCTIVAL INJECTION.

C. ARBUTHNOT CAMPBELL,  
Steubenville, Ohio.

This is a report of a painless technic for giving subconjunctival injections

that I have used in a number of cases with gratifying results. The therapeutic value of subconjunctival injections of various drugs in various conditions is beyond the domain of this report. The technic to be described I have used in children from seven years of age to adults beyond sixty years of age, and their statements have always been the same: "It was painless." The hypersensitive will manifest their condition with some complaint when they discover that their "eye is to be injected," but our experience must allay their phantasms.

All solutions used must be freshly prepared, otherwise a precipitate may occur. Especially is this liable to occur with the cyanid of mercury when it is the active drug. The solutions and syringe should be sterile. The bulk of fluid injected depends on the operator, but when large quantities are to be used, it is better to employ the procain as an anesthetic than cocain. My anesthetics of choice are cocain hydrochlorid 1.5 per cent, or procain 2 per cent, aqueous solutions. The following active drugs I have used: normal salt, hyper- and hypotonic salt, dionin and cyanid of mercury.

In detail it is as follows: To the fresh sterile solution of the active drug add fresh sterile solution of the anesthetic. I do not boil them together for sterilization. The procain or the cocain may be in strong enough solution, so that one or two drops may only be necessary to be added to the active drug solution, thus having no appreciable diluting effect on it, and at the same time giving it a 2 per cent procain or a 1.5 per cent cocain. The conjunctival sac is now anesthetized by putting in it one drop of a 4 per cent cocain solution, repeated every two minutes for four applications. Then with the sterile syringe inject the desired solution *slowly*. It is not necessary to give morphin or codein. No special after care is necessary.

I will appreciate knowing of any failures with the above technic.

# SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

## AUSTRALASIAN MEDICAL CONGRESS

Section of Ophthalmology

Held in Brisbane, August, 1920

Dr. A. L. Kenny, Melbourne, President  
Legal Recognition of Sight Testers.

The presidential address dealt with the repeated attempts made by opticians to secure legal registration as sight testers. The section would assist the opticians in any efforts made to secure a better education in their craft; but refused to have anything to do with the legal recognition of sight-testing, on the part of people who had not received a medical education. The decision was endorsed by the Congress.

### Discussion on Iritis.

An interesting discussion on iritis was opened by Dr. J. C. HALLIDAY, of Sydney, who gave a judicial summary of the present attitude.

Sir James Barrett, Melbourne, agreed with Dr. Lindo-Ferguson's classification of iritis so far as causation was concerned. He thought that approximately a third of the cases were syphilitic in origin and that about half the cases corresponded to a clinical type called rheumatic. There was no evidence that these cases had anything to do with rheumatism, but that there was abundant evidence that they were powerfully influenced by the exhibition of salicylates. He thought it desirable to retain the term rheumatoid iritis because everyone knew what it meant. Of the remaining cases a number might be due to septic foci, pyorrhea, etc., but he must confess to a skeptical attitude; tens of thousands of people had septic foci and did not get iritis.

Dr. Lockhart Gibson, of Brisbane, said that he had always found by far the majority of iritis cases to be either what he still calls rheumatic or syphilitic. He was not wedded to the term "rheumatic," except for expressing a variety of iritis which he expects to get

well if treated in the acute stage with treatment supposed to be specific for acute rheumatism. He had always put such cases in bed, and given them 20 grains of sodium salicylat every two hours, night and day. For the last seven or eight years he had given 40 grains of sodium citrat with each dose of the salicylat. It prevents disagreeable symptoms from the salicylat.

Atropin is the only local treatment he uses, 1/200 grain, four hourly, more or less. He expects an acute case with posterior synechiae, or an occluded pupil, to show a dilated pupil and greatly improved sight in 30 hours. The doses are continued, either two hourly or four hourly, according to the case. Sometimes if they are reduced too soon he has to mount up again.

Latterly he has paid attention also to possible local infection as a cause. But in the past he has never failed to get such cases well, if seen in the acute stage, without reference to the teeth or tonsils. The treatment is as specific for so called rheumatic cases as mercurial inunction is for syphilitic ones, but the doses must be as large as he gives. He did not deny the possibility of these large doses acting thru disinfection of genito-urinary tract.

### Visual Standards for Military Recruits.

SIR JAMES BARRETT opened a discussion on the subject of visual standards that should be required for military recruits. He pointed out that thousands had been rejected, owing to the imposition of a standard of visual acuity which was unnecessarily high. It had been found in Egypt that vision of 6/24 in the right eye, provided the left was not blind, was sufficiently good for most purposes. He thought that the fixation of high standards was due to a misapprehension. In the case of sailors and railway men visual acuity of less than 6/12 involved secondary color blindness, which was a

very serious matter; but the rank and file did not need to possess good color vision.

He accordingly recommended that the standard of vision be fixed as 6/18 in the right eye provided the left eye was not blind; blindness being defined as inability to count fingers at three feet distance. Or if shooting be permitted from the left shoulder vision of 6/18 in either eye, provided always that there was no progressive disease in the better eye. This visual acuity might be obtained with or without glasses, and it seemed to him that it did not matter what a man saw without glasses. The Army Council at the end of the war had fixed this standard of vision for motor drivers but without glasses, so that it was quite evident that the standard was sufficiently high. For "B" class men he suggested vision of 6/36 in one eye.

For officers he recommended the retention of the Army Council Standard of April 2, 1918. For Commission in the Royal Air Force the standard laid down by the Army Council in 1917, and for the Tank Corps the standard fixed towards the conclusion of the war. The recommendation was unanimously endorsed by the Section agreed to by the Congress and was ordered to be submitted to the Government of the Commonwealth for its consideration.

#### Optic Neuritis from Lead Poisoning.

Dr. Lockhart Gibson, of Brisbane, gave a convincing demonstration of optic neuritis in children, due to lead poisoning. The houses in Queensland are built on piles on account of the white ant trouble, the children play on the verandas which are elevated a long way from the ground, the sun pulverizes the white paint on the verandas and from the hands of the children the paint gets into the mouth. Some criticism was expressed respecting the theory, but as optic neuritis in children is very rare in Southern Australia and is quite common in Brisbane; and as some of the children have the blue line on the gums, the general opinion was that the case was proved. Furthermore when deionization was effected, by passing a current thru the

body from hands to feet, lead was found on the negative pole. The remedy suggested is to substitute zinc for lead as a basis for the paints.

#### A Recording Scotometer.

Dr. E. O. Marks exhibited an ingenious and effective large scale scotometer which was provided with a self recording apparatus.

### COLORADO CONGRESS OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

DR. MEYER WIENER of St. Louis, presiding.

Friday, July 23, 1920.

DR. W. A. FISHER, of Chicago, illustrated the use of kitten's eyes to demonstrate cataract operations.

#### Safety Procedures in the Extraction of Cataract.

Dr. H. W. Woodruff, Joliet, Illinois, stated he did not propose to cover all of the safety procedures that it is necessary to use before, during and after the extraction of cataract, but only to mention a few which he considered important and failures occur when attention is not given to them. He then read the paper published in the AMERICAN JOURNAL OF OPHTHALMOLOGY for October (see p. 739).

DISCUSSION: Dr. J. H. Thompson, Kansas City. When oculists get together they are sure to talk about cataract operations because it is the most momentous operation that they are called upon to do, one that requires great skill and one that we like to talk about. There are many things to talk about in reference to a cataract operation, but I am glad the reader brought up the loss of vitreous.

Once three or four oculists met and one said, "I have a couple of cataracts to show you." They all went to see the operations, and he lost both eyes by loss of vitreous. The reason was; he was excited, trying to show off, talking too much to the patient and was too long at it. If a man after he



touches the knife to the eye is over a minute and a half completing the operation he gets into trouble. It is an operation that should be done in that time, and must be done like clock work—first-class assistants, incision large enough, no talking, no comments, and just go right along. If there is delay accidents happen.

The loss of vitreous, as a rule, comes from making too small an incision; another cause of the loss of vitreous, and a very common one, is making a puncture in a mature cataract, and not splitting the capsule sufficiently. Consequently you can not push the nucleus out of the little hole that you have made, and you try to push it out until something collapses and you have loss of vitreous, and the only thing to do is to use the hook. It can be taken out better with a hook than with a spoon.

After you have lost vitreous, and the eye has healed up and the patient gone home, there may be detachment of the retina in two or three months. I saw a man operate a hundred times without an anesthetic, and never lose vitreous once because he did it very rapidly. If prolapse occurs shall we cut the vitreous off? When we get into this trouble the best thing to do is not to interfere with it too much.

Twice I have lost a lens in the vitreous, and let it alone. That lens came to the surface when I dressed the eye the next day, even into the conjunctival sac, and the same with a dislocated lens. With a large incision the majority of the lenses come to the surface, and then you can take it out with a hook. I would not try to squeeze it out, because you will squeeze out all the vitreous before you get it.

Another thing I would like to mention is, that in the general preparation, we are too anxious to be so awfully clean. I think people clean up too much. Try to keep the edge of the lid as clean as you possibly can. General surgeons leave the blood alone. In many instances the surgeon himself infects the eye when he goes to operate. Fortunately danger of infection has become very slight, especially since

men have taken such care in never touching the eye with anything but a clean instrument, and being so careful to keep the knife clean. That is where the infection used to come in, from an unclean knife. Usually I clean a knife in absolute alcohol and then water; and then have it perfectly dry ready for the operation. I very rarely have an infected eye; but I do get them.

Dr. John M. Banister, Omaha. I had an accident once in doing a cataract operation that jeopardized the eye very much. I made the section of the cornea and had done an iridectomy, and everything seemed satisfactory; and then suddenly the man went into an epileptic fit. But we did not get serious harm, and came out with first class results. I mention this to show how we may encounter danger.

Dr. W. A. Fisher, Chicago, Ill. I confess that I am the doctor that first began to follow Smith's idea of using cocain one time in each eye, waiting three minutes and finishing the operation. I also confess that I operated 600 times in Smith's clinic in one month, and the anesthetic was satisfactory.

Smith has done now about 50,000 cataracts, and he used the anesthetic only one time for each eye. I am sure if he needed cocain more than once he would use it. But I adopted the method spoken about, of using cocain more frequently, not for any other purpose than anesthetizing the iris, so that the patient does not feel the iridectomy.

A safety procedure that the reader did not mention was, never to allow the patient to look down. The toilet can be done with the patient looking up just as well as down. Another one is the pressure should be made from below, with the patient looking up all the time. Another, the assistant should be a trained nurse; then you always have a good assistant; one nurse can train another nurse. If you put a little cocain in the patient's eye, they can get a technic of holding the lids open that is remarkable, and they can get this technic before the operation is begun, and then you can do away with

speculums. I am sorry Dr. Vail is not here to tell you what a beautiful hook he has to hold open the lids.

Another safety procedure, the greatest of all, is to operate as many times as possible on animals before you operate at all on patients, preferably on kittens. Another safety procedure is to prepare for complications. Smith's spoon and the needle I have described, should be mastered before operation by any method is attempted.

Another safety procedure is to close the eye when you get thru. Don't do anything else afterwards. A great many do a great many things after they get thru the cataract operation.

The last safety procedure is when you get thru to bandage the eye and don't look at it; let nature have a chance to heal it up.

Dr. Robert Scott Lamb, Washington, D. C. To begin these safety procedures at the beginning, one of the things we take least into consideration is the temperament of the patient. The patient should be studied. Another one that we can use to advantage is a little training with the patient. Go thru a little course with the patient before you really intend to operate, to find out just how intelligent the patient may be in following directions, as to looking to the right, the left, up or down, immediately according to the direction, but caution him to look slowly, never making any quick motions with the eye.

Another point that can not be emphasized too much is the necessity for cleanliness. That does not mean, as I have seen done time and again, turning the lids inside out and scrubbing the surface of the lids just before operating with cotton saturated with bichlorid solution. I think that is carrying the thing to the extreme. But the margins of your lid should be clean.

Now, you not only want plenty of room for the extraction of the cataract, but you want plenty of palpebral fissure. In getting that it is wise either the night before, or the day before, to do a canthotomy. It is a practice of mine to close the tear ducts, in order

that there may be no infection coming up from the nose thru the tear sac. I believe in White's scheme, of packing the cul de sac with bichlorid ointment, the night before, holding it in. I also believe in the use of bromides, either by mouth or by rectum the day before or the night before. An hour before the operation I have 1/150 grain of atropin and a quarter of a grain of morphin injected.

I quite agree with the necessity for a large incision, and on the decided advantage of starting your incision with a knife and completing it with the scissors. I have done it many times and would rather do that than get my iris caught, roll up on the knife and cut thru with an irregular iridectomy, and it is not very difficult if you have a good pair of scissors to make this complete incision.

The eye should be very thoroly anesthetised, whether you are in the habit of using holocain or cocain, and do not be in too big a hurry, for if your patient is under control you have no need for hurry, but you have need for very careful attention to every detail.

Occasionally it seems advisable to do a capsulotomy, where you have very little aqueous, and I don't know of any better scheme than that that was suggested by Doctor Sym, of a circle following near the edge of the equator of the lens, and then take out the base of capsule by the forceps. You have your whole anterior capsule. The posterior capsule has rarely caused you any trouble. Whether to irrigate the anterior chamber after doing a capsulotomy, is a matter of personal choice.

Dr. William H. Crisp, Denver. One important precaution that has not been mentioned is that of discovering whether your patient has any decaying teeth or dental abscesses. I saw a case several years ago where an eye had been lost the previous year, and where the conjunctiva was still discharging in that same eye, and where, after I got rid of a number of bad teeth, not only did we get a successful operation on the second eye, but the old stump which had been discharging previously also cleared up entirely; so I believe it

is a wise precaution to investigate the mouth especially of your patients for focal infection.

In my opinion the crux of the whole procedure in the operation is sufficient anesthesia. I believe we are too much afraid of the use of cocain because of fear of reaction by bursting of blood vessels. With a perfectly quiet patient I usually put a drop in the other eye a little before operating.

Dr. Woodruff. As I said when I started to read my paper, I had no intention of covering all of the safety procedures that should be taken. I think perhaps I made a mistake in choosing my title, because only one has mentioned the particular thing that I wished to bring out.

Dr. Thompson's suggestion, with reference to making the operation rapid may be right or not. The incision may be made too quickly, and in cases I have suggested, if the incision had been made quickly the vitreous would have followed the incision; therefore, it is a matter of judgment whether to make the incision quickly or to complete it rather slowly. Of course it is not advisable to waste time.

I agree with Dr. Thompson about not cutting off the vitreous. I have never seen any good from an attempt to cut the part prolapsed. It is well to get the eye closed as soon as possible.

Dr. Fisher inadvertently fell into a trap. I did not refer to him. I referred to Dr. Greene, of Dayton, as the man I saw operating one afternoon—attributing his failure to the fact that he did not have sufficient anesthetic.

I did refer to Dr. Fisher in the second instance regarding his adopting Dr. Smith's method of two per cent solution of cocain, one drop. I am a great admirer of Dr. Fisher. He is very definite and positive in his statements, but he has changed wonderfully since he first came back from India regarding that.

Now he uses subconjunctival injections of cocain; he believes in complete anesthesia. The point that I particularly want to impress you with is

this: that there are certain types of cases in which extra precautions must be taken, no matter what your ordinary method of operating is. These particular cases require particular care. For instance for a patient that is mentally deranged, if you make the ordinary incision with one or two or more sweeps of the knife, you are sure to have vitreous flow. In those cases do not complete the incision; the vitreous will not escape thru a small incision; so don't complete the incision then, but take your speculum and the knife out, and then complete it with the scissors. If you complete it with the scissors you can get your incision made without losing any vitreous.

#### **Delirium Following Cataract and Other Eye Operations.**

DR. W. A. FISHER, of Chicago, read the paper published in A. J. O. for October, p. 741.

DISCUSSION. Dr. Melville Black. If we were all neurologists we might understand this subject better, or it might possibly be more confused. The psychology of this condition is of importance. I think the man who advocated that the question of elimination should be carefully looked into in these cases struck the keynote. Most of these people who become delirious after cataract extraction are merely intoxicated. The last case I had of this kind had a complete suppression of urine; and as soon as we succeeded in restoring that function the patient showed an improvement. That is, however, only one of the causes.

The man who advocated the idea that these old people away from their friends, in a hospital, hearing strange noises, strange voices, were singularly influenced by those surroundings, also struck a very important note in the causation of this trouble. There are a number of causative factors unquestionably in these deliriums after cataract extraction. It is remarkable that very few cases have been reported where the cataract was fully mature in each eye, and the patient had already undergone a considerable period of blindness before being operated upon. Hence, the importance of giving these

people the seeing eye as soon as possible, after extraction. It is my custom to give the patient the use of the eye that was not operated upon, providing he sees with it, on the fourth day, and even if he does not see with it, but has only a light perception with that eye, I give him the benefit of that.

It is also exceedingly important that those patients be allowed to see their friends. I think Dr. Fisher is absolutely right on that point. Every time that it can it should be brought about, that some member of the family is present night and day with these old people. They do not make new friends rapidly, and while they may seemingly become friendly with the nurse who is in attendance during the day, there is a new nurse at night. There are different sets of nurses night and day, unless the patient has a "special"; and if they can have some member of the family present all the time it is a great factor, in my opinion, in preventing these deliriums.

Elimination after cataract extraction, especially by the bowel, is not always highly desirable. It is usually my practice to let these people go forty-eight hours without a bowel movement, if there is no special tendency on the part of the bowels to move. The giving of a cathartic and stirring these people up is not my practice after a cataract extraction. Urine suppression, however, has to be closely watched, and these people should be encouraged to drink plenty of water. It is a subject, as you will observe by the very extensive review of the literature given by Dr. Fisher, that has caused considerable anxiety on the part of operators, and there is a great multiplicity of opinions regarding the causation and the management of these cases.

I have long since abandoned the idea of keeping a cataract case in a dark room after operation. My opinion is that it is entirely unnecessary. I keep these patients in just as well lighted rooms as any surgical case. I use a black mask over the eyes, which affords all the protection that is necessary from light; and I give the patient the use of the unoperated eye upon the

fourth day. I have never seen a case of delirium occur after that period. The cases I have had have all been before the fourth day. Fortunately we do not see many and when we do see one we hope it will be the last. The last one I saw was a woman who lived near Longmont. Her son got to the hospital within a few hours after he was called up by phone, and he said, "I believe if I could take my mother home I could manage her." I said, "Take her home; it is the best thing you can do. Take her right home with you now." He did so, and telephoned me the next day that she was very much better, and the day following she was absolutely all right, showing what an influence the home surroundings had in this particular case.

Dr. D. H. Coover, Denver. I think Dr. Black struck the keynote when he said to take these old people home. We all know that old people have a dislike for hospitals. In my early days, before we had cocaine, I did all my operations in the home, and I have never seen a case of postoperative mania in the home. As soon as I put my patients in the hospital I began to have postoperative mania, and I attributed it to the lack of home surroundings. All postoperative mania I have seen occurred in the hospitals. It seems to me it is not due to senility; it is due to a lack of companionship. You should let friends be around the patient. Talking does not hurt a cataract case, and the patients feel more at home. As Dr. Black has said, the nurses are all strange to them, and they get very little attention unless you have a special nurse. But where I have special nurses I have them ready to talk to.

Dr. H. W. Woodruff. I should like to put on record one case of delirium following cataract extraction I have had, of a man more than seventy years old, who was operated on without any special difficulty during the operation, but that night became insane and never recovered. He died in two weeks. During all that time he had to be restrained; he had to be kept in a straight-jacket. I was very glad that this patient was not in his own home. He



could not be taken home. There was no healing of the wound whatever during those two weeks. When we looked at his eye we could see the cornea move about. There was no infection, but the cornea rapidly grew hazy, and the termination was death in two weeks. There is no explanation that I know of for this, except we found out that the man had a daughter who had been in the insane asylum, and probably there was insanity in the family.

Dr. William L. Benedict, Rochester, Minn. I think that we must carefully differentiate between postoperative mania, and what we call cataract delirium. The cases of Dr. Parker, referred to by Dr. Fisher, happened at the University during my period of service with Dr. Parker, and it was my privilege to handle those cases in the hospital. The cases that were reported were cases of cataract delirium; and that did not include all of the cases of mental disturbance or psychosis that developed in the hospital during that time. These cases were carefully studied by the staff in the psychopathic hospital, and they illustrated the necessity of handling differently those cases which were classed as cataract delirium and those which showed mania.

The mania which develops is usually a latent manic depressive psychosis, with the depressive element subdued and they show the manic side. The fact was developed that the mania usually started with a sudden awakening and a desire to tear the bandages off. The deliriums begin with low mutterings, and very frequently they will call the nurses and tell them of their hallucinations. Of the cases of depressive insanity which developed during the period in the hospital or in the home, I have seen two occur in the home that did not recover and their symptoms were not improved by removing bandages or uncovering one eye. So that the difference in the reports of so many of these cases is probably due to a lack of discrimination of the type of psychosis.

Dr. R. S. Lamb, Washington. There are two sides to be considered: one is the prevention; the other is the management after it occurs. I do not be-

lieve that it is going to be possible for us to prevent this occurring in some cases. But certainly if we begin at the beginning and make a study of the patient and take the history carefully, the blood pressure, the probability of endarteritis, which includes the cerebral circulation, and also the urine contents of the cases, including microscopic examination; and then refuse absolutely to operate on cases until those conditions which are unfavorable have cleared up, and having in mind at the time that we operate that there is a liability to their recurrence just from the confinement; and then administer our bromides after operation, or chloral or codein, we will surely have very little delirium following operation.

Some years ago, in the practice of one of my colleagues, there was a patient operated on; he had both eyes bandaged, one eye being the seeing eye. There was a little reception held in this hospital, and some refreshments served, and the conversation and the clatter of dishes led the man to believe there was a fire. He rang, but did not get any attention, not having a special nurse—and I want to call attention to the advisability of that wherever it is possible—and he died before twenty-four hours had gone by. That led me to the point of never bandaging the seeing eye. I put a wide bandage snugly fitted to the closed lids, with a gauze put on with the ordinary zinc oxid adhesive plaster, and I have had patients get up and walk around in their dreams without any disturbance of the bandage at all. I have had them handle and fumble more or less with the bandage in their dreams. But the other eye was always open, and it gave them a sense of security, and in that way helped to prevent delirium. Their inability to loosen this bandage when they were dreaming I feel sure in a number of cases has saved the operated eye.

Dr. H. W. Woodruff. I want to make this one suggestion, a compromise measure would be not to put the bandage over both eyes, but just put a strip over the unoperated eye, and tell the patient in case of an emergency, if he feels that he must use that

eye, he can do so, and raise the bandage. In the hospital with the eyes tied up they may think of such a thing as a fire, but if they know that they can raise the dressing it will relieve their mental condition.

Chairman Wiener. Before asking Dr. Fisher to close the discussion, I would like to mention one case which does not seem to fit in with Dr. Fisher's theory of home surroundings preventing this delirium or mania: I recall a patient on whom I operated some years ago whom I was called to see about two o'clock in the morning two days after the operation, and the patient was delirious—had all sorts of hallucinations and ideas—and I removed the dressing from the operated eye—because the other eye was not a seeing eye. The delirium and the hallucinations stopped, and seemingly the patient grew better and entirely well. This patient went home after two weeks, but died a week after she got home.

Dr. Fisher. I would not have the society think for a minute that I am offering anything but an added suggestion for cataract patients. If I have done that much I have accomplished what I started out to do, namely to have a friend of the patient with the patient at the hospital any time and all the time that he is there. I think probably that might eliminate the fire trap that Dr. Woodruff spoke about.

I think Dr. Black is right when he speaks about taking the bandage early off the unoperated eye. I take it off in three days and he takes it off in four. I believe I would just as soon take it off in one as to keep it on for four. I do not see any necessity for keeping it on three, except that it is a habit that I have formed. Possibly the habit could be corrected by taking the bandage off the next day. I think it could, without any trouble at all.

I never heard of Dr. Woodruff's case until now. I know of several cases in Chicago that have not been reported, and of one who jumped out of the sixth-story window of a hospital, after this paper was written, and was found dead.

### Dynamics of Extrinsic Ocular Muscles with Suggestions as to Treatment of Muscular Imbalance. (See p. 878.)

DR. JOHN M. BANISTER, of Omaha, read the paper published in full, p. 878.

DISCUSSION. Dr. William H. Crisp. Years ago, when I first read about muscular imbalance, my greatest interest was in the symptoms of the condition. Dr. Banister, in a previous paper, has himself very well summarized these symptoms.

I believe I have encountered every one of these symptoms purely as symptoms of refractive errors without any kind of imbalance of the extrinsic muscles of the eye. I realize how difficult it is to know whether symptoms are due to extrinsic muscular errors or to intrinsic muscular errors. I believe that on every one of our patients we should make a test, or several tests, as regards the balance of the extrinsic ocular muscles; but when we have made that test we have to go on and get our refraction as careful and accurate as we can, and in prescribing the thing to do is usually to ignore the test that has been made with regard to the extrinsic muscles. The information is desirable for future reference; and it may be valuable in a few cases.

The greatest thing we need to learn concerning the extrinsic muscles is, as a rule, to keep our hands off. I think that in every text book on the eye, the chapter that deals with the extrinsic ocular muscles should begin with the warning "Danger, keep off." Some of the worst examples of slipshod work in the correction of refractive errors which we see in our offices, come from optometrists who are cranks on extrinsic muscular defects and who make a hobby of giving patients prisms, muscle exercises, and so on. It is very difficult, as Dr. Banister has himself indicated, to know when we are dealing with normal muscles and when with abnormal. I believe we know very little about what should be the normal balance of these muscles, and the standards which we rely upon are very artificial in their character.

A great many of the patients with muscular imbalance will show perfectly normal ability to turn the eyes in every

direction, and every now and then you will find a patient who has, say, twenty-five centrad of exophoria and yet who with proper refractive correction is absolutely unconscious of that apparently extreme muscular error.

I do not feel that Dr. Banister is right in his statement that moderate exophoria at the reading distance is abnormal. I have not gone into actual statistics in my own cases, but it seems to me that taking the great bulk of those cases which come nearest to being normal in refraction, they will show three, four or five centrads of exophoria at thirteen inches or three diopters from the eye.

I feel that I must also differ from another statement contained in Dr. Banister's paper, which I had the pleasure of reading thru, altho on account of time he has not been able to bring that statement before this meeting, and that is that seven per cent of patients will show hyperphoria. I test for hyperphoria in every patient, and I feel sure that only a very small percentage of them, nothing like seven per cent, show a hyperphoria.

As regards the question of choice between tenotomy and the various forms of advancement or shortening of the opposing muscle, I have had the benefit of experiencing what happened in my own eyes. I used to have a good deal of exophoria, for which a tenotomy of the external rectus was done first on one eye and a year later on the other. Since those operations I have never noticed anything about my own eyes that would lead me to discard tenotomy in favor of advancement where the former is adequate for the purpose in view. The cutting of a muscle, if it will serve your purpose, is very much simpler and very much less trying to the patient. I believe the great lesson of the muscle question is to be more and more careful and still more careful in our refractive measurements.

Dr. R. S. Lamb, Washington, D. C. I want to endorse what Dr. Crisp has said. I appreciate the fact that Dr. Banister is perfectly correct in some cases, but I feel that Dr. Crisp is quite right in bringing out the fact that we frequently have an exophoria.

The other phase which Dr. Crisp touched on is naturally close to my heart. I have repeatedly removed prisms from the refraction prescription of other oculists, and the patient has been made comfortable.

There is a phase that apparently is not being so well considered as it should be, and that is the effect of the general nervous system, especially of the vegetative nervous system on the ocular structures as well as the ocular muscles themselves both the extrinsic and the intrinsic muscles; and that is the question, as to whether the patient is decidedly sympatheticonic or vagotonic. In many of the vagotonics you will get a condition that is exaggerated. In many of the sympatheticonic you will get a divergence, not necessarily one that constantly shows exophoria but one that occasionally shows it. Truly, they are overexcitations of these nervous structures, whether it be leaning on one side or the other.

Now, these cases are correctible by treating the patient's general condition, with the assistance of the tinctur of belladonna or atropin, whether your convergence or divergence is one of vagotonic or sympatheticonic origin. On the other hand, with the sympathetic nervous system nothing has been found by Cannon in his experiments, but nicotin which will depress the sympathetic nervous system. There are thousands of things apparently that will excite it, but only the one, so far as we know, that will depress it. So you will have to put some of your lady friends on cigarettes and your men on cigars, to elicit whether the tendency to very marked exophoria is really due to fatigue and overexcitability of the sympathetic nervous system.

Dr. Edward J. Brown, Minneapolis. I myself am wearing three degrees in all my reading scales. I am sure that they give me great comfort. I first used two degrees, and later I have used three degrees in each scale. I have young people, and several in my own family, who developed a tendency in that direction. I have put them upon prism scales for their near work, with the best results.

I had a patient who came in lately with 28 degrees exophoria, and a con-

vergence near point of thirteen inches. I at once gave her six degrees in each scale, and when she came in a few weeks later the exophoria had gone down to 24 degrees.

One of my boys has been wearing six degrees in each reading correction for some years with great comfort. I have been in the habit of considering anything beyond six or eight degrees of exophoria as pathologic; and for patients from 12 degrees upward of inducing them, if possible, to wear a small prismatic correction. Most of them do it, but occasionally one kicks over the traces, and either I or somebody else has to remove the prisms.

Dr. Melville Black, Denver. When we start out in our careers, I think we have got to know something about the muscles, or to think we do. Personally, as I have grown older, this muscle question has either become so profound that I am unable to grasp it, or my senility is growing so rapidly that it is impossible for me to keep up with it. But it seems to me to be a perfect maze in which I am more or less lost. I wish I knew more about it. I agree with what some gentleman has written in the most lucid and intelligent manner and then I read someone else's discussion of the subject, and the more I read the more tangled I become.

But I venture to say that patients who come to me for refraction are about as well satisfied as the average man's patients. Very few of them are going elsewhere, very few are coming back to me and complaining about unsatisfactory results. After all that is what we are trying to do, we want to give the patients satisfaction; if the patient is relieved and self-satisfied we ought to be fairly well contented.

The point that I am trying to make is: Is the man who is going into this muscle proposition so extensively—so much more extensively than I am—any better pleased with his results than I am? Are his patients any better pleased? If they are, then I am failing to do my entire duty in this matter.

I remember a good many years ago I thought I had to exercise some of these cases; so I exercised them very religiously. I had them come to my

office in order that they might get this exercise under my personal supervision, and then when I sent them my bill they were dissatisfied. I piled up a great big bill, and the patients came back and said, "I am no better than when you started in with this thing." After I did that a few times I began to wonder if I wasn't doing better to go ahead as I had been in the past; and that is about the way the thing finally resolved itself.

There are a few cases, it seems to me, in which attention to muscle balance is worth while; but with the understanding of this subject that I have been able to attain up to the present time, it seems to me there are very few of these muscle cases that need special consideration.

Dr. William F. Callfas, Omaha. About forty years ago I read some of Dr. Banister's book on operation, and I saw him perform an operation, and I have seen some of his work since, and I think he is a pastmaster at this operation.

Just one thing I want to say in regard to muscular weaknesses: It has been our practice for years to examine sinuses whenever we get weakening of the ocular muscles. In many of these cases we have found an ethmoid trouble. You clear up the ethmoid and in many of the cases the muscular trouble disappears.

Dr. Edward Jackson, Denver. About the time Dr. Banister's paper appeared I was measuring prism abduction and adduction in all cases; and came to about the conclusions outlined in his paper. The prism convergence and divergence are useful, but I do not measure them as a routine portion of the examination.

The apparent balance of the muscles, especially the balance under alternate covering of the eyes, is more important. In many cases prisms should be given cautiously, and the effect tried, on the patient's comfort. Dr. Randall, of Philadelphia, has repeatedly spoken before the American Ophthalmological Society, of the great increase in ability to use his eyes in reading, the relief of his muscular asthenopia, by wearing his correction with a one-degree prism before each



eye. In a majority of cases in which there is an abnormal exophoria—six or eight centrads, the patients are more comfortable for near work if they have prisms. That is my chief use of the prisms, or decentred lenses in place of prisms.

I am not prepared to follow Dr. Banister and Dr. Landolt, in doing away entirely with tenotomy. While the bad effects of ill advised operations have been very great, there are cases that are as much benefited by tenotomy, as by advancement, and the operation is certainly less formidable.

Dr. Banister: Mr. Chairman and Gentlemen. I do not want the members of the Society to think that I am a muscle crank. I believe in treating the general system to try to build up the patient as much as possible; but there are cases where that patient is not going to get well. I told Dr. Black, and I trust that he will try to utilize it, that if he brings a pen point up to a patient, and that patient can not see that point single at a shorter distance than six or eight inches, all the correcting or refracting on earth is not going to make that patient have perfect use of the eyes, because he hasn't enough convergence. I am an urgent advocate of a refraction and trying its correction first before I operate.

I have recently received a letter from a lady in Portland, upon whom ten years ago I operated. She had a little exophoria but she got double vision, and she was a nervous wreck. I operated on this lady ten years ago. She asked me if I could give her the name of anybody in Portland who did that operation, because she hadn't had any symptom of asthenopia since; and she had a friend with the same symptoms who wanted to get some man to do that type of operation.

The principle that we must consider in this is that it is not a weakness of the muscle; it is a weakness of the convergence; and if you can supply from the brain center the proper convergence stimulus to the internal recti muscles, why you are doing the job.

But not having the stimulus to the muscles, what is the best thing to do? To clip the external recti, which are none too strong? Or go on the opposite side and give increased convergence power to

the muscles which are not strong enough. With the same convergence power you can get a greater effect by shortening the muscle to which the innervation is carried. That is the principle. With the given innervation you can get a greater effect from the advanced muscles.

I had one young man that had prism exercises, and other treatment used on the ocular muscles, yet they didn't get strong. He would get diplopia and he was liable to fall out of his machine. These are practical facts and one practical point is worth a good deal of theory. I took the tuck in his internal rectus muscle to get the images in proper position. He went back to the University of Nebraska and carried on his course with impunity, and he has never had any trouble since. If there is anything to relieve him that could have been done, other than giving him proper power on his convergence, I don't know what it is.

#### Some Optical Imperfections of the Eye and Some of Their Uses.

DR. HENRY SEWALL, of Denver, read the paper upon this subject published in full, p. 865.

DISCUSSION. Dr. Edward Jackson, Denver: One point bearing on Dr. Sewall's paper is the explanation by Dr. Edridge Green, for the yellow coloration of the macula lutea. The remainder of the retina carries bloodvessels which must give a decided yellowish tinge to the light. The macula being free from any circulation of blood requires for its best vision some such tinge to the light; which is afforded by the yellow coloration in the retina at that point. Then a practical point which is worth investigating is the pathologic effects of artificial lights on certain patients, who can not comfortably use their eyes at all by any of the ordinary methods of artificial illumination.

There is no apparent structural difference which accounts for their unpleasant sensitiveness to certain kinds of light, or the pain and discomfort they suffer in an attempt to use the eyes by it.

With reference to the statement of Helmholtz that he would reject such an imperfect optical instrument as the eye if furnished by an optician, there is in it a good evidence of failure to grasp the

breadth of the ocular function. Dr. Sewall has brought out that the image formed by the eye is as good or better by this instrument (that seems optically so imperfect by ordinary standards) than would be formed by the best microscopic objective. Dr. Sewall referred to the wide angle of the field, which is only approached by the best and most elaborate microscopic objectives. In peripheral vision the resolving power is much lower than at the fixation point, the retina lying in front of the focus of the dioptric media. But an imperfectly resolved image probably helps what the peripheral retina is superior in, perception of movement and of slight differences of illumination.

If you will test your own eyes, you will observe that the peripheral retina is quicker to catch movement, is quicker to catch slight differences in amount of illumination than the macula. This can be seen in noticing clouds that are almost uniform in the sky. You can get the most distinct differences in the brightness of a cloud, not if you look right at it, but when you look away from it and get its image on the peripheral retina.

Dr. R. S. Lamb, Washington. We are indebted to Dr. Sewall for bringing out a very important fact, which it seems to me has a definite value in explaining some of the things that we find in practice. For instance, it accounts for fatigue upon exposure to glaring light. We have all noted the red vision which follows such exposure—stimulation and then the taking away of that stimulation and leaving the eye just seeing red. We have looked at the sun or at a headlight and then we couldn't see the road. It also accounts for the fact that we will note fatigue more quickly if we attempt to read by a concentrated light, not relieved by diffused light in the same room. If the patients have been inclined to read late at night by a lamp lighting only the page, the eye has become very much more fatigued than if a diffused light is thrown on the room at the same time.

Dr. William H. Crisp, Denver. In connection with the brief comments that have been made as to the eye seeing better if the light comes from one side, I noticed some years ago that in my office, which faces on the court, during the

darkest part of the day when the general illumination of the room is a good deal less than the rest of the day, I get better results on the test card if I turn on the center lights in my room than if they are off. The visual acuity is greater with the center lights turned on, than if the room is only lighted by what is thrown on the test card. The amount of illumination given to the card by that center light amounts to very little.

I was sorry that Dr. Sewall did not discuss the question of how far our psychology accounts for delight in green. The fact that our animal ancestors and our human ancestors for perhaps a million years, on account of their not always having food or shelter, and not having the warmth that comes with summer and the green that accompanies it, found such delight in green, that there might be sufficient reason for the present preference for green, perhaps over any other color.

#### **Clearing of Vision in Unoperated Cataract:**

Dr. E. N. Robertson, Concordia, Kans., read the paper published in full in the November issue, p. 820.

#### **Tonometry and the Prevention of Glaucoma:**

Dr. Edward J. Brown, Minneapolis, Minn., read the paper published in the September number, p. 669.

DISCUSSION: Dr. James A. Patterson (Colorado Springs) being absent Dr. William H. Crisp (Denver) read for Dr. Patterson, as follows:

Dr. Brown states that the readings from his tonometer will be almost as dependable as the measurement of a board with a carpenter's rule, provided the tonometer is held sufficiently long to secure an accurate minimum. Now, we know, in order to obtain accurate readings, that the tonometer must not rest on the cornea too long, nor must it be applied again excepting at a considerable interval. I therefore feel that no instrument, to obtain accurate results, should be kept in situ more than a few seconds.

The most instructive part of Dr. Brown's paper is the fact that his clinical cases show that where there is undue eyestrain, there is an increase of tension; showing that there is more or less disturbance in the uveal tract, which

apparently disturbs the regular ratio of the interchange of fluids, so essential for the prevention of glaucoma and for the proper nutrition and full function of the eye. This deduction is made assuming these tonometric readings were made before any cycloplegic was used. As the text does not mention these facts my opinion must be based on these surmises. Of course, if the tonometer findings were had after a cycloplegic they would be considered normal.

I disagree with Dr. Brown's statement "that simple chronic glaucoma is a practically universal condition." By palpation we may reduce the tension in those eyes that are functionally disturbed and have a functional hypertension. Placing the fingers on the eye you get a certain sensation of hardness that conveys an impression to your mind depending entirely upon how much experience you have had in using the method. I use it on every patient that comes into the office, man, woman or child. I have done it for years, and I get information on which eye is probably worse. Even in refractive errors, with eyestrain, I get the impression of which is the bad eye.

If you palpate an eye that has apparently an increased tension, wait a moment or two and then take the tension again with the fingers, you will note that the tension has gone down in those cases in which the eye has a functional hypertension. I think that some of those that Dr. Brown speaks of are only functional, and that is why he finds them more or less universal. The individual may have a tension after lunch or after dinner, and not later on. That kind of tension occurs in individuals who do close ocular work, but it is only a functional hypertension, which, as soon as the relationship in the ordinary flow of fluids is restored by exercise or for some other reason, comes back to normal. The other cases, however, in which there is more or less permanency, and in which there is probably a simple chronic glaucoma, will remain hard, even after palpation. I think this is a method that is neglected to too great an extent nowadays. We had, of course, to depend on it at one time entirely for our knowledge of tension.

Dr. Edward Jackson. The basis of our knowledge of increased tension must

be some conception of normal tension, and I believe that our conceptions as to normal tension of the eyeball are still to be modified and greatly improved. One writer on glaucoma has recently taken the stand that there is probably a fixed normal tension of the eyeball, and any variation from it, even slight variations, of, say, more than five millimeters, must be regarded as abnormal.

I believe that the limits of normal tension are wider apart than has generally been accepted—more than ten millimeters. The limits of variation of tension that do not constitute glaucoma, but are liable to occur under temporary perturbations of the eye, or the general system, are much wider than that. The nearest analogy we have to ocular tension is blood pressure, and we are just beginning to learn, after many thousands of observations that we can have great variations in blood pressure, which have little or no pathologic significance. Or if they have pathologic significance it is such as we do not yet understand.

For instance, a physician known to many of you has had a blood pressure running well over two hundred mm. of mercury for some years, and is apparently still in good health. We see patients whose systolic pressure runs up to two hundred millimeters, who seem to be in health and have continued in health for years.

The number of cases in which intra-ocular tension of over 30. mm. of mercury has been noticed is quite large. Some of them are very clearly a temporary ocular condition; others are probably connected with temporary conditions of blood pressure. Those patients return to normal and continue normal.

I had a patient alarm herself, because her mother was suffering from glaucoma, and her stepfather had suffered from a traumatic glaucoma, and they knew in that family the terrible nature of the disease. She had an intra-ocular pressure of 32 to 35 mm. by the Gradle and also by the Schiötz tonometer—I think I never found it below thirty millimeters. She continued thus for years, and her eye is still normal, with normal vision. After she was convinced that she was not on the brink of

an outbreak of glaucoma she became free from her subjective symptoms.

We have encountered enough of these cases to know that they exist; and before we assert that any particular degree of tension indicates glaucoma we must know more about the cases in which the same degree of tension does not indicate glaucoma.

To go back to blood pressure: The rise of blood pressure depends on two factors, on the force of the heart and the resistance in the peripheral circulation. To overcome a peripheral resistance, that does not represent some distinct pathologic process may not be dangerous or particularly damaging to the patient. On the other hand, patients have gone thru very long lives apparently with low blood pressure. I saw one within a week whose blood pressure runs from 100 to 120 mm., a man of eighty years. I know of another one still older whose blood pressure of late years has never been over 120 mm.

The blood pressure is to accomplish a certain result; it is to furnish against different obstacles the necessary circulation. In the eye, I believe, that the intraocular tension is to accomplish a certain result, with the resistance varying at different times, a different tension must be maintained in order to keep that eye in a state of health.

We do not know very much about intraocular tension yet; and we must extend our observations more widely, and must have more of them under circumstances quite apart from clinical glaucoma. But to say that a certain tension as registered on Brown's instrument, or any instrument, shows a case of simple glaucoma, is simply a modification of language. Glaucoma stands in our minds a clinical entity; and unless these cases go thru the course that is represented by the term "simple glaucoma," it is a misuse of the term to call them such.

Dr. William H. Crisp, Denver. We have an interesting parallel between the measurement of blood pressure with the manometer and the clinical relations, on the one hand, and the measurement of the intraocular tension with the tonometer on the other. We may see patients with a blood pressure considerably over 200, who apparently are in a condition of rel-

atively good health for a number of years and who show no marks of breakdown of any of the blood vessels. On the other hand, we may see patients with a blood pressure of 120 who show marked manifestations of vascular breakdown, who may have vascular lesions in the eye which are responsible for destruction of vision.

Coming to the tonometer, we have cases that show rather above the average tension without marked clinical disturbance. We have patients who show an intraocular tension well within the average normal limit who have what we call simple glaucoma. There is a relation about the matter that needs a good deal more analysis than we have given, before we take measurement with the manometer or with the ocular tonometer as showing glaucoma present or absent. I do not believe that Dr. Brown's paper condemns all the tonometers, including the various modifications of the Schiötz, which we have used. I feel that we can go on to use our old tonometers for information to some extent. Because after all what we need mostly to get with the tonometer is a comparison between one eye and another, not necessarily to know that we have the absolute measurement; and the Schiötz and Gradle tonometers give a fair comparison between different eyes and the same eye at different times.

Dr. Melville Black, Denver. In looking at this instrument I am impressed with the fact that I have a good deal of trouble seeing the scale, and I am just wondering if we can see it. I also wonder if this is a permanent instrument, or whether the doctor is in the act of perfecting it. We should have a scale that we could see more readily. It would seem to me very difficult to see that scale accurately enough, while I was holding this instrument upon the cornea, to be able to read it readily. If those numbers were marked in black or with larger numbers, it would seem to me to facilitate the handling of the instrument.

Dr. Edward J. Brown. Dr. Black's criticisms are entirely just. That instrument is the only one I had made aside from the one I made myself out of the piece of brass or copper, with a little assistance from a mechanic, which cost me



a dollar and a quarter, I believe. This instrument was made not by an instrument man, but by a machinist, and I have not been able as yet to get another instrument made. I have three others in the same shop which I hope I can have finished up in better shape. All these criticisms are just, it is a difficult instrument to read. I got the thing finished up as it is to the best of my ability, with the best material at hand.

I recognize the justice of all these criticisms. Beginning with Dr. Patterson's question: I hold the instrument on the cornea for just long enough to get a definite reading, and if the reading is suspiciously high, I repeat it, but after I have taken the reading from the other eye. It is true that I find sometimes that my second reading is lower than the first.

Gradle says that three or four minutes massage of the eyeball will reduce the tension three degrees. It is possible that the amount of pressure from that instrument, which here is about two ounces, will reduce the tension enough so that there will be a noticeable difference. But I try to use the instrument with skill and with common sense.

Most of my measurements have been made without the use of a mydriatic. Some were made before and some after.

Dr. Crisp questions whether I condemn other tonometers. I think that my instrument is a more practical and a more convenient instrument than the others and more truthful in regard to intraocular pressure. I believe with Dr. Crisp that the other instruments, if used carefully and skillfully, will give comparative readings which, perhaps, are the important thing, or they would have to be thrown upon the junk pile.

#### Value of Dental Examination in Ocular Disorders.

(DR. WILLIAM L. BENEDICT read the paper published in full on p. 860.)

DISCUSSION. Dr. William C. Finnoff, Denver. The reading of a paper on focal infection at this time calls for about as much discussion as the reading of a paper on cataract. I think that ophthalmologists realize the importance of focal infection, especially about the teeth, in the production of certain inflammatory and reflex conditions of the eye. The manner in which this takes place has not

been clear, but Dr. Benedict has classified the modus or spread of infection.

Formerly it was thought that infection passed from the teeth along the bony canals and along the periosteum thru the lymph vessels and thru the blood vessels to the eye. Infections of the orbit, lids and conjunctiva could pass very readily along the periosteum and to these structures; but an intraocular infection must necessarily be of hemotogenous origin, organisms passing from the primary focus to the secondary focus thru the blood.

In certain focal infections the removal of one particular focus does not necessarily clear up the secondarily inflamed area that happens to be in the eye. With modified secondary changes, with abscess formation or with breaking down of tissues in the eye, a removal of the primary focus will not remove the organisms that are producing this particular infection. The suggestion of treating those eyes with autogenous vaccines after the teeth have been removed, I think is very valuable.

I do not think that we all realize the necessity of obtaining X-ray pictures of all the teeth where focal infection is suspected. A great many of us are inclined to take the dentist's word when the reports show negatively on the teeth. I think we should always insist on X-rays of the teeth to determine whether root abscesses are present or not.

Another point that I think is not generally understood by ophthalmologists, in determining whether focal infections of the eye are due to the teeth or not, is about the taking of cultures. There are a great many men who believe that the finding of streptococci in pyorrhea pockets or abscessed roots positively demonstrates that that particular area from which the streptococci were obtained is the area which was producing the infection. The mere finding of streptococci proves nothing. In order to prove that the lesion is produced by this particular area it is necessary to make cultures according to the technic of Rosenow. Simply making these cultures on blood serum does not prove anything; but according to Rosenow's technic and then obtaining the lesions in the animal, certainly proves conclusively the particular area from which the infection was derived. I am a firm believer in the selective action of these streptococci.

Dr. Black. Mr. Chairman, personally I can not agree with the doctor with regard to prophylaxis previous to cataract extraction. I have come to believe that I do not wish to operate for cataract until the mouth of that individual has been placed in a proper hygienic condition, and most all of these old people who come for cataract extraction, if they have any teeth left, are certainly open to a great deal of suspicion. With the many years of dental knowledge to save teeth, when a man has reached sixty or seventy, those teeth remaining, many of them will be found to be dead; and all such teeth, at that age particularly, are certainly open to suspicion.

Furthermore, pyorrhea, a septic condition unquestionably of the mouth, is very closely adjacent to the eye. Granted, even, there may not be in this particular case a lymph stream or a blood stream, or any other sort of direct communication. Such septic condition so close to the eye, in my opinion, should be considered in a different manner from one that is not septic, at least in that way. It is my practice in all cases of cataract to postpone the operation until the mouth of that individual has been placed in a hygienic condition.

Dr. John O. McReynolds, Dallas, Texas. I would like to emphasize the position taken by Dr. Black. I believe that I have made several mistakes in the past in not having assistance on the proper preparation of the mouth before operating both for glaucoma and cataract. I recall a number of cases, for instance, that had glaucoma in both eyes, in which I would operate on one eye and succeed in avoiding an operation for glaucoma on the other eye. Simply by attention to the teeth the necessity for the operation for glaucoma had passed away. Then I have seen cases of chronic iritis, in which there was adhesion of the iris to the lens; even after they had been infected for ten years, would yield to nothing until the dental infection was removed. Given this fact, that these diseased teeth will have a distinct influence in the production of glaucoma and in the production of iritis; we ought to place our patient in such a position that there will not be the slightest possible tendency toward the development of

uveitis, or the development of glaucoma, after an intraocular operation.

I feel quite convinced that in the future I would be doing a great service to my patient in making him more comfortable in every way, if I should insist on a perfect condition of the teeth, before I should agree to an intraocular operation.

Dr. R. S. Lamb, Washington. The question arises whether the other methods in vogue in the Mayo clinic are not an offset to the complications that might arise, and would arise probably in the practice of most of us not so fortunately situated. Personally, I refuse to operate on a cataract case until the mouth has been reported by the dentist as surgically clean from his viewpoint. If it requires the removal of all the teeth, it is a small sum to pay for keeping an eye following an operation.

We, all of us, had some years ago cataract extractions which gave us immense difficulty with subsequent iridocyclitis. The operation was perfectly clean; there was no reason to expect that immediately following the operation any complication such as that would arise. Now, we know in many of those cases it was the teeth, and it is not necessarily the pyorrhea, as generally spoken of, where we have a very definite discharge.

Stengel, in an article some time ago, confirmed this. There was an absolutely negative report from the dentist, in a case of iritis which he was trying to work out, associated with chronic albuminuria. The X-rays were perfect, there was no pyorrhea; but there must have been absorption from the colon sufficient to account for the albuminuria because with the removal of the teeth and the thorough cleansing of the mouth, the albumin disappeared from the urine for the first time in some years. Those of you who know Stengel, know that he is a thoroughly capable man.

I feel as tho I wanted to emphasize what Dr. Black and Dr. McReynolds had to say, that it seems very essential that we keep in mind that our practice differs somewhat according to the locality, the condition, environment and everything considered; and we have got to think of the patient and his welfare first before the reputation of the physician or anything else.

Dr. W. A. Fisher, Chicago: To be on the popular side, I should agree with the last three speakers and condemn Dr. Benedict's stand; but it is impossible; I couldn't do that. I do not recall ever having an infected eye that I could trace to a bad tooth. In 600 operations that I was permitted to do in India, there were three infections. I reported those cases. They are the dirtiest people, probably, on earth; they have no dentistry; ninety per cent of them have trachoma; and I really think that the teeth have been *overdrawn* just a little.

Dr. McReynolds. May I ask, Doctor, if you would operate in this country on a patient with trachoma, for cataract?

Dr. Fisher. I have. Yes, I should operate on a patient in this country with trachoma, because I couldn't cure it anyway. I would never operate, if I didn't.

Dr. Benedict. I heartily agree with Dr. McReynolds and Dr. Black and also with Dr. Fisher. I too have operated on a patient with trachoma for cataract. The reason I injected it into this paper was thru a question that was asked me at the Hot Springs meeting by old Chief Dr. Parker. He says, "We all agree that the mouth should be cleaned up before a cataract operation. In your opinion, how long should we wait after the mouth has been cleaned up before we should proceed with the operation?" I hesitatingly but reverently told him that I disagreed with his first statement. I had no post-operative complications that I traced to the eye; that was the main basis for it.

The other is this: we know that extraction of teeth alone does not remove the disease of the bone, nor does it remove the danger from pus, which is probably disturbed by the extraction of the teeth with forceps.

We have very frequently seen cases where the teeth have been removed without leaving symptoms. Now, when successful in that way we can pick out with the forceps a small pus sac, that is just as definite as a polyp to be taken from the nose. But when that sac is destroyed by the ordinary tooth extraction that pus is partly absorbed, and in absorbing the pus we also absorb the organisms, and the organisms going thru the blood stream are deposited in other tissues, as

you saw in the picture in the attachments of the muscles to this rib. This sets up secondary foci infection, which may last as long as the original would last in a tooth which had been unmolested.

Unless extraction of the tooth is done surgically clean; unless all of these things are removed so that you do not set up secondary foci, you have opened up another avenue of infection. Is the barrier that the person's body presents to the infection dependent upon the amount of toxins that are eliminated from this focus in the blood stream? You can overcome that by injecting large quantities of organisms, or you can strengthen the barrier by the use of properly moderated toxins, which were described as vaccines.

I agree with the doctors perfectly that it would be all right to remove all of the primary foci, and immediately combat the secondary foci by the use of vaccines, but where is the end? This patient has put up a barrier against these diseases; which he has found adequate for a number of years. We know that these diseases can go for a number of years, and he has never had any eye trouble from it. His eye is not going to have a great amount of reaction unless postoperative inflammation of the eye is set up. Then it may be increased, and that is where this focus comes in. Iritis may continue for a long time, but if in addition to that we have toxins from some septic focus, it will last an indefinite length of time.

If we carefully check all of our dental examinations with the culture experiments as well as we can; and it must be done with the method of Rosenow, or some similar method, it still holds we are starting a process that may prove very bad. We are never sure when we are pulling these teeth and stirring up a focus, that we are not going to do more harm than good. So that if a thing is getting along fairly well and has been for a number of years, unless we do too much damage to the eye at the time of operation, that eye is going to carry thru the intraocular operation. I don't know the number of them, but we have had a sufficient number of such eyes and we never have had a single inflammatory complication that can be traced to a dental infection.

(To be continued.)

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## INSANITY AFTER CATARACT EXTRACTION.

The discussion on delirium and insanity following cataract and other operations on the eye, illustrates the peculiar value of the discussion of such a subject in a medical meeting. The paper, bringing clearly to mind what has been the common experience regarding this condition in the past, is a necessary start. But the peculiarly valuable thing about a medical discussion is the variety of points of view, which come out as different men give the results of their own observations and experiences. In this way a more complete picture of the condition under discussion results than it is possible to get in any other way.

The danger of delirium, or more permanent insanity arising to complicate the after treatment of cataract extraction, is sufficiently great to demand careful attention from every surgeon who operates for senile cataract. The whole list of acquired insanities are associated with deteriorations in nutritive processes, that are closely akin to

the lowered grade of vital activity that comes on with age. The obscure nutritive failure that produces senile cataract, is closely allied to the obscure nutritive deterioration that predisposes to insanity. One may suspect that such a predisposition may be lurking in a large proportion of patients suffering from senile cataract.

From modern laboratories of psychology have come many of the recent important contributions to our knowledge of physiologic optics. Psychology begins to realize that its processes are founded upon and deal primarily with sense impressions. Modern psychiatry recognizes that delusions are likely to be built up from sense hallucinations. Change of accustomed sense conditions tends toward mental instability. Fixed worry over an impending misfortune—advancing blindness, with uncertainty of relief, and disturbance of eliminating from diminished exercise entailed by poor sight, all contribute to the dangerous predisposition.

For exciting causes we have the emotional perturbation of the crisis in



strong hopes and fears, that have come to occupy a large part in the subjective life of the patient; the risks of submitting to an extremely delicate and important operation, in full consciousness, but without seeing what is going on; the tendency to accumulation of toxic substances in the body, incident to enforced rest in bed, all bear upon a patient cut off from sight and subjected to unfamiliar sounds. Crile and Lower have shown that the changes produced in the central nervous system are the same in surgical mutilation, shock, intense fear and extreme exhaustion. In the patient subjected to operation for senile cataract we have also the lowered power of resistance and recovery of age. That some of our patients will succumb to this combination of adverse influences is certain.

It is therefore the duty of one who advises and performs the extraction of senile cataract to guard in every way possible against the danger of delirium or insanity following the operation; just as it is his duty to guard against displacement of the flap or infection of the wound. He should study the patient and his surroundings with reference to mental condition and environment, as he would look for signs of arteriosclerosis or albuminuria. He should plan to guard the patient against danger of diminished elimination, unnecessary shock, avoidable change of environment, excessive excitement or anxiety about the result, with the same care that he exercises in planning the steps of the operative procedure.

The subject is one of great practical importance, which only becomes manifest when we bring our individual experiences and add them to the common stock of knowledge, and seek to apply all the available methods to avoid this danger. It is one that has been recognized for more than 100 years. What has been learned of mental disease since the days of Rush and Pinel has expanded the subject, until it is one of the most important; to be broadly comprehended by the ophthalmologist who undertakes to extract senile cataract.

E. J.

## RIGHT TO COLLECT FOR SERVICES

A decision of great importance to physicians has been rendered by the Supreme Court of Wisconsin in the case of Noer vs. G. W. Jones Lumber Co. Briefly stated, the plaintiff was called in to attend an employee of the company; but when his bill was rendered the company claimed that the amount was excessive and requested that the matter be referred to the industrial commission for adjustment. The plaintiff refused and sued for the amount of the bill. The court held that the provisions of the workmen's compensation act were binding on employers and employees electing to be bound by them; but all others are strangers to the act and their usual lawful rights and remedies are unaffected by it. The act does not provide that the physician rendering the aid, which the employer is obligated to provide, must submit the reasonableness of his fee to the industrial commission.

Oculists, as well as other members of the medical profession, are frequently confronted with the condition that when they have rendered services to an employee at the request of an employer, and have presented a bill commensurate with the value of the service rendered, they are referred for its payment to an insurance company, whose contract with the employer contains a fixed scale of compensation for services rendered to employees. This compensation was never agreed to by the oculist, but he must accept the amount or go thru a course of letter writing and even at times must sue for the amount of his bill.

It would seem from the above decision that a logical extension would be that the physician is in no way bound by a contract between an employer and an insurance company, to which he is not a party, and a test case would probably result in holding the employer for the full amount of the bill. It certainly would do away with the unpleasant necessity of correspondence to determine the party responsible for the payment of the bill.

C. L.

### THE ACADEMY MEETING

It was at Kansas City, April 9, 1896, that the Western Ophthalmic and Oto-Laryngologic Association was organized. Seven years later its name was changed to American Academy of Ophthalmology and Oto-Laryngology, and it underwent a general reorganization. October 14-16 it held its twenty-fifth annual meeting in Kansas City, and demonstrated more clearly than ever that it is one of the most important special medical societies in America, and a leading progressive organization aiding in the advancement of science.

Altho its dues were doubled last year to provide a fund to assist scientific research, the Treasurer's report showed no falling off of membership. Of over 1,100, nearly 300 were in attendance, while the applicants admitted at this meeting numbered 234. The scientific program was up to its usual high standard. Some of the papers read before the meeting will appear in later issues of this Journal. But the meeting was most notable for the new features that attended it, or were projected by it for the future.

The American Board for Ophthalmic Examinations held its examinations for the first time in connection with the Academy meeting, and the first time west of the Mississippi River. Over forty candidates were awarded the certificate of the Board, beside those whose applications were held over for future action, and others that were rejected. These examinations were held at the Medical Department of the University of Kansas, under the most favorable conditions that the examiners have enjoyed in the five years they have been carrying on such examinations.

On the day preceding the meeting, also at the Medical Department of the University of Kansas, there was arranged by a committee of the Academy a demonstration of slides showing the normal and pathologic anatomy and histology of the eye. These were shown under more than 40 microscopes, furnished by the above named institution, and each was accompanied

by a typewritten slip calling attention to the notable features of the specimen. The slips were supplemented by verbal explanations by Dr. William C. Finnoff, who had prepared the exhibit. These slides were seen by about 20 members of the Academy. But others, who heard of it later, regretted having missed the opportunity, and the possibilities of such demonstrations so impressed the meeting that on recommendation of the council it was resolved to devote three days to such "graduate teaching," in connection with the next meeting of the Academy. In moving for such action Dr. Greenwood pointed out that the Academy was just entering upon a most important function implied in its name.

As previously determined, the Academy, like the American Ophthalmological Society, will hereafter require the certificate of the American Board for Ophthalmic Examinations of ophthalmologists applying for membership. It was evident that this would create an anomalous condition if oto-laryngologists, or those practicing both specialties, could still be admitted without passing any such examination. For years the creation of such a board to examine in oto-laryngology has been discussed, and agreed to in a general way, but not carried out. At this meeting the Academy broke the deadlock by creating its own board of six, to examine in oto-laryngology until such time as a National Board should be established by cooperative action of all national organizations interested in this subject. We believe the formation of such a National Board will speedily follow, and the requiring of those who claim special knowledge or skill in any branch to demonstrate it will become common.

The committee on investigation of the Etiology of Iritis, composed of Wm. C. Finnoff of Denver, John Green, Jr., of St. Louis, and W. L. Benedict of Rochester, Minn., reported that they had accumulated 80 cases furnished for the purpose, but that several hundred cases should be brought together, and that these cases should be carefully studied by laboratory methods to

make their work most valuable. They asked the further co-operation of Fellows of the Academy in this undertaking, and that of ophthalmologists outside of the Academy will be equally welcome. One or two well-studied cases are worth more in this connection than any number of cases in which the etiology has been guessed at.

The officers of the Academy for the coming year are: President, Emil Mayer of New York City; Vice Presidents, First, John R. Newcomb of Indianapolis; Second, R. F. Ridpath of Philadelphia; Third, William C. Finnoff of Denver; Secretary, Luther C. Peter of Philadelphia; Treasurer, Second H. Large of Cleveland; Editor, Clarence Loeb of Chicago; Councilors, Horace Newhart of Minneapolis and E. C. Ellett of Memphis. The committee in charge of the graduate teaching is Harry S. Gradle of Chicago, W. P. Wherry of Omaha, and Meyer Weiner of St. Louis. The next meeting is to be held in Philadelphia, the exact date to be fixed after consultation with the Fellows of that city.

E. J.

### THE JOURNAL YEAR

We have no desire to dwell upon the difficulties this JOURNAL has to meet and overcome in common with other journals, scientific and literary, in order to keep up its standards and continue publication. But an occasional frank statement regarding the situation seems due to our subscribers and contributors, who are really partners in the enterprise.

During the past year we have had to meet two increases in cost of printing in all its departments, which amounted in the aggregate of 21 per cent over the very high prices prevailing at the beginning of the year. The present contracts between the printing firms and the unions terminate in February, and if those who dominate the unions believe the state of the labor market makes it possible, there will doubtless be another increase at that time. It is impossible to get paper except by ordering months in advance,

and then paying the price prevailing when it is delivered. Up to the present time this price has been moving upward.

Under these circumstances it has only been possible to continue the AMERICAN JOURNAL OF OPHTHALMOLOGY and OPHTHALMIC LITERATURE at their present level, by the cooperation of larger lists of subscribers than have ever before joined to sustain an ophthalmic journal. The continuance of this cooperation and support, in the prompt payment of their own subscriptions and in speaking of the publications to others (more than half the oculists of America still take no ophthalmic journal) will make it possible to continue our publication as we desire in spite of the adverse conditions.

During the past year, by publishing 12 numbers in 11 months, we have succeeded in bringing the date of publication to the first of each month, altho inadequate mail service has often delayed the delivery, and the mails seem particularly overburdened near the close of the political campaign.

Failure to pay promptly and keep the names on the regular subscription list is always a cause of increased expense and greatly increased labor for our office force. To all who will save us this expense we are glad to give something in return. We, therefore, will send to all subscribers, new or old, who pay before January 1, 1921, copies of one of the unlearnable test figures alluded to in our November issue, page 843. Additional time will be allowed for those who live outside of the United States. This is not a premium for subscribing; it is a premium for prompt payment.

The policy of the JOURNAL will not be changed with reference to its associated publication, OPHTHALMIC LITERATURE with its Yearbook Digest of the literature of ophthalmology, with classified bibliographies. In this way our readers are given command of the literature of the world relating to ophthalmology, carefully classified, sifted and condensed. To meet the requirement of the post office department regarding such publications, a separate price has to be set upon

each. But the price for the two will not be increased over that paid when they were issued together.

THE OPHTHALMIC PUBLISHING CO.

### BOOK NOTICES

**Ophthalmic Operations**, edited by **Harold Grimsdale, M. B., F. R. C. S., and Elmore Brewerton, F. R. C. S.**, 438 pages with index. London, Bailliere, Tindall & Cox. Price, 18 shillings. 179 illustrations.

This is the second edition of this textbooks, the first having proved a reliable guide to the operator.

Not all operations, by any means have been considered by the authors and the choice will not appeal to every one; in fact, altho the book covers 438 pages, it is really a description of "some operations." These are succinctly described and are accompanied by diagrammatic illustrations, which aid the understanding. For operations on the lids, the descriptions given are perhaps sufficient, but for intraocular operations, even those on cataract and glaucoma, the descriptions are not quite those of the operations that may be commonly seen in America, i. e., the technic is somewhat different. Other operations, such as those on the cornea, muscles and foreign bodies in the eye, should have merited more exhaustive descriptions. The book is recommended as a reliable guide for the surgeon.

H. V. W.

**Travaux Neurologiques de Guerre**, Preface du Professeur **Pierre Marie**, by **Georges Guillaumin and J. A. Barre**. 463 pages with index and paper cover. Masson et Cie, Paris. Price, 18 francs.

This work on the Neurology of the Eye is an admirable exposé of work done during the war, being a collection of separate essays, part of which were published during that time in various French journals, describing injuries to the brain, spinal cord, their membranous and osseous covering and the peripheral nerves, organic lesions produced by action from a distance of explosions, commotions, etc.

The grouping of the work is original, especially that under *Semiology of the Nerves*, where the various reflexes are exhaustively studied, particularly the medio-plantar, tibio-femoral posterior and peroneo-femoral, which enrich the technic of examination and render clinicians a real service. In particular, the description of a large number of cases of complete section of the spinal cord is of interest. The first three chapters are taken up by semiology, particularly of the reflexes; the second part by injuries of the encephalon; the third with those of the spinal cord; the fourth with commotions of the brain and cord without external injury; the fifth with pathology of the cranial and spinal nerves, and the sixth with five separate essays.

It goes without saying that the structure of the eye and its nerves have been affected in a large proportion of the instances and cases cited in this book, and herein is the direct interest to the oculist, as these ocular conditions are cited in detail and accompanied by a number of illustrations. This is a work that marks an advance not only in the history of injuries, but as well in the technic of examination.

H. V. W.

**Report of Transactions Heidelberg Ophthalmological Congress**, Fortieth meeting, 1916. 536 pp. 110 illustrations. Compiled by **A. Wagenmann**, Secretary, Wiesbaden, **J. F. Bergmann**.

German publications are beginning to come to us thru regular trade channels. In this way we now have the above transactions, four years after the holding of the meeting therein reported. This fortieth meeting was held 53 years after the founding of the Society, more than three years having elapsed since the thirty-ninth meeting in May, 1913. The meeting was held in the midst of war which had been going on for two years, and was occupied chiefly by war ophthalmology.

There are papers and discussions on: The visual tracts and centers and their various injuries encountered from war wounds. The ophthalmoscopy of in-



injuries of the skull, traumatic impairments of ocular movements and foreign bodies in the eye are leading topics. The treatment of ocular wounds, sympathetic disease and protheses, all come in for consideration. Hemeralopia, general ophthalmic practice in field service, the dazzling of aviators, refraction and protective glasses in military service, and conditions of psychogenic origin are all taken up.

A minority of papers refer to parts of ophthalmology not especially connected with military activities. Altogether 53 papers are included in the volume, 20 of which are accompanied by reports of more or less discussion. The remarks of Professor Leber in opening the Congress refer to the absence of foreign members on this occasion. The names of these, from countries with which Germany was then at war, are carried on the list of over 700 members. The list of deaths since the last meeting in 1913 includes 34 names and should include that of Dr. Hasket Derby of Boston, who died in 1914. The resignations number 14, and 37 new members were elected at this meeting. The absence of colored plates in this volume contrasts sharply with the number published in its immediate predecessor. E. J.

**Atlas of War Ophthalmology.** A. von Szily. Collection of the war ophthalmological observations and experiences at the eye clinic of the University of Freiberg i. Br. With a preface by Prof. T. Axenfeld. 589 pp. with 511 illustrations and 77 plates, 65 of which are colored. Ferdinand Enke, Stuttgart, 1918. (See also A. J. O. v. 3, p. 365.)

This magnificent atlas with its interesting and valuable text will be heartily welcomed as a lasting scientific monument from the great war. On account of the geographic location of Freiberg, large numbers of recently wounded eye patients were sent without loss of time directly from the battlefields, right from the beginning of the hostilities in 1914, and also later after they had been for more or less longer periods in more distant hospitals. Thus the author was

enabled to see an abundance of eye injuries from the moving armies and from the war in the trenches.

All important conditions were photographed, skiagraphed with Roentgen rays, the ophthalmoscopic changes studied with the large ophthalmoscope of Gullstrand, and reproduced in four color prints, and the anatomic and historical findings of some cases, observed during life, carefully described and illustrated. The injuries of this war show, in consequence of the modern methods of fighting, certain peculiarities, which are compared with those from former wars, and the literature is extensively utilized, with bibliographies after each chapter.

The first part contains the chapters on injuries of the skull and eyes, orbital-temporal lesions, war hemianopias, injuries of the orbit and its surroundings with remaining projectiles, lesions by projectiles of greater destroying force.

For the interpretation of the ophthalmoscopic image and the indications as to operative procedure, the exact distinction of choked disc and optic neuritis is advocated. As to the degree of prominence, attention must be paid in the first place to inflammatory changes of the disc, which in cases of optic neuritis with slight swelling are in the foreground. Complications which lead to these inflammatory changes are much more frequent in injuries of the skull than is spontaneous choked disc in tumors of the brain. Choked disc and optic neuritis in injuries of the skull are important symptoms of complications; increased pressure, bone fragments, foreign bodies, meningitis, encephalitis, etc.

This symptom may be present even if the general condition of the patient is good and without his complaining of his eyes. It deserves the greatest attention, and if the first examination is negative it is urgently necessary to control cases of injuries of the skull from time to time with the ophthalmoscope. The occurrence or recurrence of optic neuritis or choked disc in the course of treatment always is a threatening sign, as well as the aggravation

of the condition found at the first examination, and justifies a radical revision of the wound by the surgeon. If there is a difference between the right and left eyes, the swelling of the disc is, in four-fifths of the cases, greater on the side of the injury.

The author does not venture to decide with absolute certainty whether the diagnosis of choked disc or optic neuritis should be a signal for immediate operation. He quotes instances of the favorable effect of immediate operation and also those in which waiting for more significant general cerebral phenomena, at least in the majority, was not detrimental to the patient. On plate 1 excellent pictures illustrate choked disc in cerebral abscess after occipital injury: (1) at the first appearance of cerebral symptoms almost two months later; (2) increase of congestion; (3) regression of choked disc after successful operation.

The very interesting chapter on hemianopsias deals with quadrant hemianopsias and hemiamblyopias, color, homonymous, bilateral inferior hemianopsias, hemianopic scotomas; with photographs, Roentgen skiagraphs and visual fields. From these and the present knowledge gained also during peace, it appears that the visual center is not limited to the calcarine fissure and its lips, but probably extends to the lower part of the cuneus and ventrally to the gyrus lingualis, perhaps behind to the gyrus fusiformis.

The following chapters discuss and illustrate metastatic ophthalmia after-war injuries, penetrating shots with an exit, with splendid ophthalmoscopic and histologic pictures of the accompanying chorioretinitis proliferans and atrophica, bilateral injuries, war blindness and the care of the blind, perforating injuries, intraocular foreign bodies, which the author believes represent half of all ocular injuries and infec-

tions. Eyes with projectiles in the interior are mostly lost.

On account of early preventive enucleation sympathetic ophthalmia was rare. The author found only in one out of 80 eyeballs examined by him in serial sections changes suspicious of exciting inflammation. If the eyeball is completely destroyed, the contents of the orbit must be carefully searched for remnants of uvea, which, according to Stock, may show chronic inflammation identical with that of the exciting eye in sympathetic ophthalmia.

Ophthalmoscopically visible foreign bodies were rare, on account of the severe lesions of the ocular tunics by the kinetic energy of the modern projectiles, which prevented a view into the depth. Even after successful extraction of copper and brass and pieces of grenades, about 50 per cent of the eyes were lost thru later complications.

Very interesting are the pictures of hemorrhagic infiltration of the cornea in hemophthalmus. The 11th chapter gives a discussion on the changes of the macula due to lesions chiefly of the choroid and isolated lesions of the retina, e g., the formation of holes in the macula, with many instructive ophthalmoscopic and anatomic pictures. The question of the existence of a post-traumatic primary glaucoma is, according to the experiences in the war, answered in the negative.

Then follow chapters on gas diseases, injuries and burns by gas grenades, bombs, etc., organic lesions of motility and sensibility, with remarks on psychogenetic defects after injuries of the brain, psychogenous war neurosis, lesions of the accessory sinuses and lacrimal passages, and finally the valuable chapter on plastic operations with numerous illustrations. There is a table of contents, and an index of subjects and names concludes the admirable work.

C. Zimmermann.

## NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

### DEATHS

Dr. H. Ulrich, University of Vienna, died recently at the age of 44.

### PERSONALS

Major-General G. S. Ryerson, of Toronto, will spend the winter in Southern Europe.

Dr. W. A. Schwartz of Phoenix, Arizona, has returned from a trip to the East.

Dr. Myles Standish is now established in his new office at 52 Hereford street, Boston.

Dr. L. Maud Carvill has been appointed Clinical Assistant at the Massachusetts Charitable Eye and Ear Infirmary.

Dr. H. B. Carpenter of Lancaster, N. H., has succeeded to the practice of the late Dr. A. J. Lance, and has removed to Portsmouth, N. H.

Dr. A. J. Ballantyne has been appointed Lecturer in Ophthalmology to the University of Glasgow, to succeed Dr. Maitland Ramsay, retired.

Dr. Allen Greenwood attended the meeting of the American Academy at Kansas City, where he gave a paper entitled "Lacrimal Sac Extirpation Simplified."

Dr. E. A. Meyers of Superior, Wisconsin, is taking a postgraduate course in Chicago. He will return to his old location, where he will continue in the practice of eye, ear, nose and throat.

Dr. Raphael Silva has resumed his post as Professor of Ophthalmology in the school of advanced studies of the University of Mexico, to which he had been chosen in 1916.

Dr. William Zentmayer of Philadelphia, by invitation of the Medical Society of the State of Virginia, read a paper before that body on the evening of October 28th, upon "Ocular Angiosclerosis."

Dr. Hans Barkan, Assistant Clinical Professor of Ophthalmology at Stanford University School of Medicine, has returned to active duty in that institution, after an absence of nearly two years.

Dr. T. H. Shastid has taken offices in the Lyceum Clinic, Lyceum Building, Duluth, Minnesota, where his practice will be limited to refraction and consultation. The doctor will continue to reside in the neighboring city of Superior, Wisconsin.

Dr. Thomas Collins Austin, formerly of the United States Army, announces the opening of offices at 619 Chamber of Commerce Building, Pasadena, California. Dr. Austin will limit his practice to diseases of the eye, ear, nose and throat.

Among the recipients of the F. A. C. S. at the recent meeting in Montreal, were the following ophthalmologists: Dr. C. D. Conkey, Duluth, Minnesota; Dr. C. E. Lum, Duluth, Minnesota; Dr. R. C. Smith, Superior, Wisconsin; Dr. C. C. McCullough, Fort William, Ontario, W. S. Hunt, Port Arthur, Ontario and Dr. M. H. Boerner, Austin, Texas.

Col. Wm. H. Wilmer of Washington, D. C., by invitation, read a paper before the Ophthalmic Section of the College of Physicians of Philadelphia on the evening of October 21st. Dr. Wilmer was entertained at dinner at the Union League by Dr. G. Oram Ring, Chairman of the Section, and was given an informal reception and smoker after the meeting by Dr. B. Alexander Randall, Professor of Otology at the University of Pennsylvania, at his residence 1717 Locust Street. Discussion of Dr. Wilmer's paper was opened from the standpoint of the internist by Dr. Hobart A. Hare of the faculty of the Jefferson Medical College; from the standpoint of the neurologist by Dr. F. X. Dercum of the same faculty, and from that of the ophthalmologist by Dr. George E. de Schweinitz and Dr. Howard Forde Hansell.

Colonel Casey A. Wood, one of the editors of the JOURNAL, has left for the Tropical Research Station of the New York Zoological Society, at Kartabo, British Guiana. He plans to spend the coming winter doing some work in the Station laboratory, on the comparative ophthalmology of birds and reptiles. As is well known in scientific circles, this neotropical Station has for its Director William Beebe the celebrated naturalist and writer. The introduction to his work on Tropical Life was written by Theodore Roosevelt, who spent some time making investigations at this Station. Colonel Wood proposes to make this work and collection in part the basis of a contemplated monograph on The Eye and Eyesight of Birds. It is interesting to note in this connection that Colonel Wood has recently presented to McGill College the Emma Sherer Wood Library of Ornithology, in honor of his wife who is a native of Montreal. The library comprises about nine hundred volumes besides numerous pamphlets and periodicals; and covers every subject which has to do with birds or bird life, and even extends into the field of natural history in general, as well as including the biographies of famous ornithologists. In the opinion of several experts in ornithology, this library when complete will compare favor-

ably with any ornithological collection of books in existence.

#### SOCIETIES

The first meeting of the New England Ophthalmological Society for this season was held Tuesday evening, November 6th, 1920.

The first Annual Clinical Congress of the California Section of the American College of Surgeons will be held in San Francisco, November 18th and 19th, 1920.

"The Eleventh Annual Meeting of the Oxford Ophthalmological Congress was held in Oxford in July. Among the Americans participating were Dr. S. Lewis Ziegler of Philadelphia, who presented a paper on "The Ocular Menace of Wood Alcohol Poisoning," and Dr. Luther C. Peter of Philadelphia, who opened a discussion on "Perimetric Methods."

The Chicago Ophthalmological Society has had, since last spring, a specially appointed committee attempting to work out the details of a contemplated plan for the Society to undertake postgraduate teaching of ophthalmology. The committee presented its report at the first meeting of the present season, October 18th. After a thoro discussion it was the opinion of a large majority of the members present, that the plan was, at least at the present time, impractical. The report was therefore rejected and the committee discharged.

At the October meeting of the Kansas City Eye, Ear, Nose and Throat Club, clinical cases were shown by Drs. Kimberlin, Schutz, Lorie, Lichtenberg, Roberts and Curran. Dr. Kimberlin's case was one of a myopia which will be reported in this journal. Dr. Schutz showed a case of sympathetic ophthalmia, eye now quiet with some useful vision remaining. Subconjunctival injections of cyanid had been used. He also showed an interesting injury case and one in which iridotomy had been done. Dr. Lichtenberg showed a case of Parinaud's conjunctivitis, and an injury case in which practically the whole iris had been torn loose. Dr. Curran's case showed in the two eyes the difference in depth of the anterior chamber before and after iridotomy for glaucoma.

At the meeting of the American Academy of Ophthalmology and Oto-Laryngology held at Kansas City, October 14, 15, 16, upon recommendation by the Council, the Society endorsed a resolution that hereafter Oto-Laryngological men can become members of the Society upon the same terms, only, as the ophthalmologists. The Committee for examinations of the Oto-Laryngologists was as follows: Joseph C. Beck, Chicago; T. S. Carmody, Denver; J. M. Ingersoll, Cleveland; Harris P. Mosher, Boston; R. C. Lynch, New Orleans; Ross Skillern, Philadelphia. The first examinations will take place in Boston at the next meeting of the American Medical Association. The next meeting of the Society will take place in Philadelphia. The three days following the meeting will be devoted to postgraduate work under the supervision of a committee composed of: Harry S. Gradle, Chi-

cago; W. P. Wherry, Omaha, and Meyer Weiner, St. Louis. Postgraduate lectures will be given by men of national reputation. For this course a registration fee of five dollars will be charged.

#### MISCELLANEOUS

Under the will of the late Jacob H. Schiff, of New York, the New York Association for the Blind received a bequest of ten thousand dollars.

A recent news item in the daily press repeats the statement that, among the Maoris, who are now Christianized, the belief still survives from heathen times that the soul of each human being resides in the left eye.

Dr. Lucien Howe of Buffalo, has given to the American Ophthalmological Society the sum of fifteen hundred dollars, the income from which is to provide a suitable gold medal for a thesis on ophthalmology, open to candidates whether or not members of the Society.

Health Commissioner Copeland, of New York City, has made public a letter recently written to Secretary of State Hugo, in which he suggests that amendments be made to the sanitary code making it impossible for those with defective vision or hearing to become chauffeurs.

Dr. J. W. Jervy, of Greenville, South Carolina, has been devoting much time to the frequent confusion of trachoma and conjunctival folliculosis in school children, as a result of recent compulsory physical examinations. He very properly takes the view that trachoma is rare, and folliculosis is very prevalent.

The National Committee for the Prevention of Blindness states that out of one hundred thousand blind in the United States more than fifty per cent are needlessly so. The national council estimates there are two hundred thousand eye injuries in our land; and the International Association of Labor Legislation has issued a list of fifty-six industrial poisons, of which thirty-six affect the eyes.

The Valentin Haüy Association for the Welfare of the Blind has deposited in six municipal libraries of Paris a collection of special books printed in Braille type, to be placed at the disposal of blind readers residing in the department of the Seine, under the same terms that govern the loans of the ordinary collections in the libraries. The books may be removed to the homes of the readers, and they will be replaced at intervals from funds provided by this Association.

Papers and discussions by members of the Illuminating Engineering Society are frequently of great interest and value to the ophthalmologist, especially in the lines of physiologic optics. This proved to be the case at the Convention of the Society recently held in Cleveland. Among other papers of exceptional interest we would mention particularly that of Mr. P. G. Nutting on "Optical Principles in Illuminating Engineering" and the one on "Effect of Variations of Intensity of Illuminating on Functions of Importance to the Working Eye," by Ferree and Rand.



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